



Australian Government

MEM05 Metal and Engineering Training Package

Release: 9.1

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Modification History

Version	Release Date	Comments
9.1	21 March 2013	<p>ISC upgrades to MEM20105, MEM20205 and MEM30105</p> <p>Inclusion of ISC advice on target groups, assessment requirements and pathways.</p> <p>Other minor corrections to MEM05042B, MEM05043B, MEM05044B, MEM05045B, MEM05046B - Australian Standard code corrected to AS4041.</p>
9	21 December 2012	<p>Endorsed changes:</p> <ol style="list-style-type: none"> 74 new MEM units of competency 32 existing MEM units replaced/not carried forward Three updated qualifications with inclusion of additional elective streams: <ul style="list-style-type: none"> MEM50212 Diploma of Engineering – Technical MEM60112 Advanced Diploma of Engineering MEM80112 Vocational Graduate Diploma of Engineering <p>Refer to summary mapping for details.</p> <p>ISC upgrades:</p> <ol style="list-style-type: none"> MSA Competitive Manufacturing elective units replaced with Competitive Systems and Practices units Additional prerequisite pathway for MEM07004B Five (5) updated qualifications with additional/replaced elective units Three (3) updated qualifications with unit title correction Various typographical errors corrected Appendix 3 re-numbered to 2 Appendices removed: <ul style="list-style-type: none"> Appendix 2: MEM05 units, prerequisites, points and weighting (available on the MSA website Training Package information page: http://www.mskills.com.au/Info.aspx?TAG=MSA.Info.CIP) Appendix 4: Revised MEM unit codes 2006 Appendix 5: MEM05 qualifications mapping to MEM98 Appendix 6: Units of competency mapping to MEM98
8.1	3	ISC upgrade

Version	Release Date	Comments
	September 2012	Prerequisite correction in MEM3009A - outcomes remain equivalent. Refer to unit for details.
8	29 June 2012	<p>Endorsed changes</p> <ul style="list-style-type: none"> One (1) new qualification – MEM40412 Certificate IV in Engineering Drafting Twenty five (25) new units of competency Four (4) existing MEM units not carried forward <p>Refer to mapping for details.</p> <p>ISC upgrades</p> <ul style="list-style-type: none"> Five (5) qualifications updated to include new CAD units of competency: <ul style="list-style-type: none"> MEM30505 Certificate III in Engineering – Technical MEM50211 Diploma of Engineering – Technical MEM50311 Diploma of Jewellery and Object Design MEM60111 Advanced Diploma of Engineering MEM60211 Advanced Diploma of Jewellery and Object Design Inclusion of additional fourteen (14) imported units Imported unit codes updated (MEA) <p>Refer to mapping for details.</p>
7	30 March 2012	<p>Addition of:</p> <ul style="list-style-type: none"> One (1) new qualification <ul style="list-style-type: none"> MEM31112 Certificate III in Engineering (Composites Trade) Twenty one (21) new units of competency <p>ISC upgrades</p> <ul style="list-style-type: none"> The new units have also been included as electives in existing MEM qualifications. <p>Refer to Summary Mapping for details.</p> <p>ISC corrections</p> <p>Qualification reloaded (corrected for version 6 but not appearing on TGA):</p> <ul style="list-style-type: none"> MEM50105 – correction to packaging advice for holders of a Certificate IV Errors corrected re dual band status and formatting made consistent for the following units: MEM05026C, MEM05042B, MEM05043B,

Version	Release Date	Comments
		<p>MEM05044B, MEM05045B, MEM05046B, MEM05053A, MEM05054A, MEM06009A, MEM07016C, MEM07018C, MEM07019C, MEM07020C, MEM07022C, MEM12003B, MEM12004B, MEM13010A, MEM15022B, MEM17001B, MEM17002B, MEM18010C, MEM18011C, MEM18019B, MEM18021B, MEM18022B, MEM18049C, MEM18050C, MEM18054B, MEM18056B, MEM18062B, MEM18065B, MEM18066B, MEM18067B, MEM18091B, MEM18092B, MEM19018B, MEM20008A, MEM20011A, MEM20012A, MEM20013A, MEM24002B, MEM24004B, MEM24006B, MEM24008B, MEM24010B, MEM24012C</p> <p>•</p>
6	23 December 2011	<p>Addition of:</p> <p>Two (2) new qualifications</p> <ul style="list-style-type: none"> • MEM40311 Certificate IV in Advanced Jewellery Manufacture • MEM80111 Vocational Graduate Diploma of Engineering <p>• Forty six (6) new units of competency</p> <p>• Thirty two (32) new imported units of competency.</p> <p>ISC upgrades:</p> <ul style="list-style-type: none"> • Unit codes corrected in Group D in MEM50311 • Band A and 4 points allocated to MEM19038A for use in Certificate IV <p>Qualifications:</p> <p>MEM10205 Certificate I in Boating Services</p> <p>The following units missing from the electives have been reinstated:</p> <ul style="list-style-type: none"> • MEM50007B • MEM50008B • MEM50009B • MSAENV272B <p>MEM50105 Diploma of Engineering - Advanced Trade</p> <ul style="list-style-type: none"> • Correction to packaging advice for holders of a Certificate IV

Version	Release Date	Comments
5	September 2011	<p>Endorsed changes:</p> <p>Two new qualifications:</p> <ul style="list-style-type: none"> MEM50311 Diploma of Jewellery and Object Design MEM60211 Advanced Diploma of Jewellery and Object Design <p>New and additional units of competency:</p> <ul style="list-style-type: none"> 21 new MEM units of competency 46 additional imported units of competency <p>Refer to summary mapping for details.</p> <p>ISC upgrade to one unit of competency:</p> <ul style="list-style-type: none"> MEM05006C Perform brazing and/or silver soldering (descriptor and range clarified to include braze welding)
4	June 2011	<p>Additional components:</p> <ul style="list-style-type: none"> 17 new aeronautical and avionic units of competency and 14 additional units of competency imported from MEA07 for inclusion in the following revised MEM qualifications: <ul style="list-style-type: none"> MEM50211 Diploma of Engineering - Technical MEM60111 Advanced Diploma of Engineering three new MEM high risk units of competency and nine imported high risk licensing units for inclusion as electives in existing MEM qualifications (refer to mapping for details of packaging and qualifications affected) one new unit of competency for the fuel system installation and service sector, for inclusion as an elective in existing MEM qualifications MEM unit version codes corrected in MEM40105 <p>Refer to Summary Mapping for details of changes to qualifications.</p>
3	March 2011	<p>The following endorsed components have been included in MEM05v3:</p> <ul style="list-style-type: none"> one new qualification – MEM31010 Certificate III in Watch and Clock Service and Repair 23 new specialist watch and clock service and repair units of competency. <p>The new units will also be available as electives in MEM20205, MEM40105 and MEM50105, and have been included in the Certificate III Trade Specialisation unit list.</p>

Version	Release Date	Comments
		ISC Updates <ul style="list-style-type: none"> • All qualifications adjusted to comply with flexibility and sustainability requirements (refer to Mapping for details). • Competitive Manufacturing and PMB imported units updated. • Additional imported units – MSAENV272B, 472B and 672B. • Minor errors corrected in units and Volume 1 (refer History for details).
2.2	30 June 2010	ISC updates Qualifications adjusted to comply with flexibility rules: MEM10105, MEM20105, MEM20205, MEM50205 and MEM60105. Refer to History for details.
2.1	June 2010	PDF reloaded to NTIS with following corrections: MEM30205 - qualifications notes corrected. No change to packaging rules. Revised unit listed incorrectly as MEM07008D Perform milling operations - changed to MEM07007C Perform milling operations.
2	December 2009	Summary of changes Four new metallurgy units of competency and one new imported unit added to elective bank in MEM40105. ISC upgrades to 18 existing units (affecting MEM20205, 30105, 30205, 30305, 30305, 30405, 30605, 30705, 30805, 50105, 50205, 60105) Expanded descriptors for five qualifications (MEM30205, MEM30305, MEM30405, MEM40105 and MEM50105). Refer to History below for details.
1.02	September 2007	Category 1 changes A range of minor corrections made including typographical errors, omissions and clarifications Airconditioning and Refrigeration units of competency To meet new licensing requirements for installers of split air conditioning systems and domestic air conditioning and refrigeration

Version	Release Date	Comments
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systems, one existing unit has been modified and two new units included in the elective banks of MEM05:

Modified unit

MEM10013A Install split air conditioning systems and associated pipework to include aspects of evacuation, testing and pipework.

This unit replaces and is not equivalent to MEM10012A Install split air conditioning systems. MEM10012A will be discontinued.

New units

MEM18084A Commission and decommission split air conditioning systems

MEM18085A Install, service and repair domestic air conditioning and refrigeration appliances

The new and modified units are intended to be available for licensing purposes in MEM20105 Certificate II in Engineering. Due to the flexible and open design of the training package, the units are also available as electives in other qualifications such as those listed below. Discretion should be applied when deciding if the units are suitable for selection within a specific qualification.

MEM20105	Certificate II in Engineering
MEM20205	Certificate II in Engineering - Production Technology
MEM30105	Certificate III in Engineering - Production Systems
MEM30205	Certificate III in Engineering - Mechanical Trade
MEM30305	Certificate III in Engineering - Fabrication Trade
MEM30405	Certificate III in Engineering - Electrical/Electronic Trade
MEM30705	Certificate III in Marine Craft Construction
MEM40105	Certificate IV in Engineering
MEM50105	Diploma of Engineering - Advanced Trade

Version	Release Date	Comments
1.01	October 2006	Decimal points in all MEM05 codes replaced with zero to enable loading to NTIS. Refer to schedule below.
1.00	December 2005	Primary release.

Version 3

Refer to mapping for details on changes to qualifications and replacement imported units.

Corrections/Category 1 changes

A range of minor corrections including typographical errors, omissions and clarifications.

Inconsistencies corrected in the units and prerequisites listing in Volume 1.

Points weighting listed incorrectly in three units:

- MEM12007D corrected from 8 to 4 points – points listed in qualifications remains as 4
- MEM20001A corrected from 6 to 4 points – points listed in qualifications remains as 4
- MEM20010A corrected from 2 to 4 points – points listed in qualifications remains as 4.

Prerequisite listed in MEM25008B corrected to MEM25007B (not 25008C).

Inclusion of metallurgy units in Certificate III Trade Specialisation list

MEM04020A	Supervise individual ferrous melting and casting operation
MEM04021A	Supervise individual non ferrous melting and casting operation
MEM04022A	Examine appropriateness of methoding for mould design
MEM04023A	Undertake prescribed tests on foundry related materials

Following eight units added to Fabrication Trade stream units in MEM30305

MEM06001B	Perform hand forging
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MEM06002B	Perform hammer forging
MEM06003C	Carry out heat treatment
MEM06004B	Select heat treatment processes and test finished product
MEM06005B	Perform drop and upset forging
MEM06006C	Repair springs
MEM06008A	Hammer forge complex shapes
MEM06009A	Hand forge complex shapes

Following 12 units added to Electives Group B in MEM60105

MSACMT280A	Undertake root cause analysis
MSACMT421A	Facilitate a Just in Time (JIT) system
MSACMT430A	Improve cost factors in work practices
MSACMT432A	Analyse manual handling processes
MSACMT440A	Lead 5S in a manufacturing environment
MSACMT450A	Undertake process capability improvements
MSACMT451A	Mistake proof a production process
MSACMT452A	Apply statistics to processes in manufacturing
MSACMT460A	Facilitate the use of planning software systems in manufacturing
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area
MSACMT481A	Undertake proactive maintenance analyses
MSACMT482A	Assist in implementing a proactive maintenance strategy

Updated imported units

Competitive Manufacturing unit codes updated from MCM to MSACM.

PMB units updated to B versions.

References to units from relevant qualifications updated to current qualification codes.

(Note: all replacement units are equivalent).

MEM05v2.2

Flexibility changes

Importation allowances increased and qualifications reworded to include choice from accredited courses. Elective banks include units approved for selection from other qualifications in MEM.

MEM10105	Certificate I in Engineering	Importation allowance increased from 5 to 7 points
MEM20105	Certificate II in Engineering	Importation allowance increased from 6 to 8 points
MEM20205	Certificate II in Engineering - Production Technology	Importation allowance increased from 11 to 14 points
MEM50205	Diploma of Engineering - Technical	Importation allowance increased from 2 to 3 units
MEM60105	Advanced Diploma of Engineering	Importation allowance increased from 4 to 5 units

MEM05v2

New MEM units of competency

MEM04020A	Supervise individual ferrous melting and casting operation
MEM04021A	Supervise individual non ferrous melting and casting operation
MEM04022A	Examine appropriateness of methoding for mould design
MEM04023A	Undertake prescribed tests on foundry related materials

New imported unit

MSATCM304A	Interpret binary phase diagrams
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Revised existing MEM units

MEM05v1.02	MEM05v2	Unit title	Comment
		Metallurgy	
MEM24012B	MEM24012C	Apply metallurgy principles	Minor edits to include reference to alloys.
		Critical Trade Units	
MEM04005B	MEM04005C	Produce moulds and cores by hand (jobbing)	Redefined and updated Evidence Guides
MEM05010B	MEM05010C	Apply fabrication, forming and shaping techniques	Redefined and updated Evidence Guides
MEM05011C	MEM05011D	Assemble fabricated components	Redefined and updated Evidence Guides
MEM05015C	MEM05015D	Weld using manual metal arc welding process	Redefined and updated Evidence Guides
MEM05017C	MEM05017D	Weld using gas metal arc welding process	Redefined and updated Evidence Guides
MEM05019C	MEM05019D	Weld using gas tungsten arc welding process	Redefined and updated Evidence Guides
MEM05026B	MEM05026C	Apply welding principles	Redefined and updated Evidence Guides
MEM05037B	MEM05037C	Perform geometric development	Redefined and updated Evidence Guides
MEM07005B	MEM07005C	Perform general machining	Redefined and updated Evidence Guides
MEM07006B	MEM07006C	Perform lathe operations	Redefined and updated Evidence Guides
MEM07007B	MEM07007C	Perform milling operations	Redefined and updated Evidence Guides
MEM07008C	MEM07008D	Perform grinding operations	Redefined and updated Evidence Guides
MEM12006B	MEM12006C	Mark off/out (general	Redefined and updated

		engineering)	Evidence Guides
MEM12007C	MEM12007D	Mark off/out structural fabrications and shapes	Redefined and updated Evidence Guides
MEM18006B	MEM18006C	Repair and fit engineering components	Redefined and updated Evidence Guides
		Circuit testing	
MEM18049B	MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	Redefined skills and knowledge for circuit testing - equivalent
MEM18050B	MEM18050C	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.	Redefined skills and knowledge for circuit testing - equivalent

Qualifications affected

MEM05v2	Qualification name	Comment
MEM40105	Certificate IV in Engineering	Addition of four metallurgy units to Specialisation Group 1 electives and one imported unit added to Specialisation Group 2 electives.
MEM30205	Certificate III in Engineering -Mechanical	Expanded qualification descriptor
MEM30305	Certificate III in Engineering -Fabrication	Expanded qualification descriptor
MEM30405	Certificate III in Engineering - Electrical/Electronic Trade	Expanded qualification descriptor
MEM40105	Certificate IV in Engineering	Expanded qualification descriptor
MEM50105	Diploma of Engineering -Advanced Trade	Expanded qualification descriptor

Preliminary Information

Important Note to Users

Training Packages are not static documents; they are amended periodically to reflect the latest industry practices and are version controlled. It is essential that the latest version is always used.

Check the version number before commencing training or assessment

This Training Package is Version 9.1 - check whether this is the latest version by going to training.gov.au and locating information about the Training Package. Alternatively, contact Manufacturing Skills Australia (MSA) 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).

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MEM05v9 - Mapping of Changes

Qualifications updated and endorsed in MEM05 version 9

MEM05v8 qualification	MEM05v9 qualification	Comment/ equivalence
MEM50211 Diploma of Engineering – Technical	MEM50212 Diploma of Engineering – Technical	Suite of new elective units added – overall outcomes remain equivalent
MEM60111 Advanced Diploma of Engineering	MEM60112 Advanced Diploma of Engineering	Suite of new elective units added – overall outcomes remain equivalent
MEM80111 Vocational Graduate Diploma of Engineering	MEM80112 Vocational Graduate Diploma of Engineering	Range of new elective units added – overall outcomes remain equivalent

ISC upgrades to existing qualifications

MEM05v8 qualification	MEM05v9 qualification	Comment/ equivalence
MEM20305	Certificate II in Boating Services	One unit title corrected
MEM30905	Certificate III in Boating Services	One unit title corrected
MEM40205	Certificate IV in Boating Services	One unit title corrected
MEM40412 Certificate IV	MEM40412 Certificate IV	MSACM units replaced by competitive systems and

MEM05v8 qualification	MEM05v9 qualification	Comment/ equivalence
in Engineering Drafting	in Engineering Drafting	practices units Equivalent
MEM20205 Certificate II in Engineering – Production Technology	MEM20205 Certificate II in Engineering – Production Technology	New elective unit added Equivalent
MEM30105 Certificate III in Engineering – Production Systems	MEM30105 Certificate III in Engineering – Production Systems	New elective unit added Equivalent
MEM50311 Diploma of Jewellery and Object Design	MEM50311 Diploma of Jewellery and Object Design	One elective unit replaced Equivalent
MEM60211 Advanced Diploma of Jewellery and Object Design	MEM60211 Advanced Diploma of Jewellery and Object Design	One elective unit replaced Equivalent

MEM05v9 Mapping of new technician units to MEM05v8

Notes

1. This table shows new/revised units for the technician qualifications in the Metal and Engineering Training Package (prerequisites are listed in italics)
2. The new units relate to the following engineering disciplines (as indicated in the discipline column):
 - Manufacturing
 - Mechanical
 - Mechatronic
 - Maintenance
 - Heating, ventilation and cooling/refrigeration (HVAC/R)
1. The units are packaged as electives in the MEM qualifications as shown in the packaging column.

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	MEM07041A Perform production machining	New unit	MEM20205 MEM30105	
	<i>MEM09002B Interpret</i>			

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>technical drawing</i> <i>MEM12023A Perform engineering measurements</i> <i>MEM18001C Use hand tools</i>			
MEM09151A Apply computer aided modelling and data management techniques to mechanical engineering designs	MEM09155A Prepare mechanical models for computer-aided engineering (CAE) <i>MM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanics principles</i>	Not equivalent	MEM60112 MEM50212	Mechanical Drafting
MEM09152A Apply CAD modelling and data management techniques to mechatronic engineering designs	MEM09156A Prepare mechatronic models for computer-aided engineering (CAE) <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanics principles</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i> <i>MEM23112A Investigate electrical and electronic controllers in engineering applications</i>	Not equivalent	MEM60112 MEM50212	Mechatronic Drafting
MEM09141A Represent mechanical engineering designs	MEM09157A Perform mechanical engineering design drafting	Not equivalent	MEM60112 MEM50212	Mechanical Drafting

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
graphically				
MEM09142A Represent mechatronic engineering designs graphically	MEM09158A Perform mechatronics engineering design drafting	Not equivalent	MEM60112 MEM50212	Mechatronics Drafting
MEM14061A Plan and design mechanical engineering projects	MEM14085A Apply mechanical engineering analysis techniques <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>	Not equivalent	MEM60112 MEM50212	Mechanical
MEM14062A Plan and design mechatronic engineering projects	MEM14086A Apply mechatronic engineering analysis techniques <i>MEM23004A Apply technical mathematics</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i> <i>MEM23112A Investigate electrical and electronic controllers in engineering applications</i> <i>MEM14090A Integrate mechatronic fundamentals into an engineering task</i>	Not equivalent	MEM60112 MEM50212	Mechatronic
MEM14063A Plan and design manufacturing engineering	MEM14087A Apply manufactured product design techniques	Not equivalent	MEM60112 MEM50212	Manufacturing

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
projects	<p><i>MEM14089A Integrate mechanical fundamentals into an engineering task</i></p> <p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM23063A Select and test mechanical engineering materials</i></p> <p><i>MEM23109A Apply engineering mechanic principles</i></p>			
MEM14064A Plan and design maintenance engineering projects		<p>Not carried forward</p> <p>Content covered by a range of units</p>		
	<p>MEM14088A Apply maintenance engineering techniques to equipment and component repairs and modifications</p> <p><i>MEM14092A Integrate maintenance fundamentals into an engineering task</i></p> <p><i>MEM23004A Apply technical mathematics</i></p>	New unit	MEM60112 MEM50212	Maintenance
MEM14081A Apply mechanical engineering fundamentals to support design	<p>MEM14089A Integrate mechanical fundamentals into an engineering task</p> <p><i>MEM23004A Apply technical mathematics</i></p>	Not equivalent	MEM60112 MEM50212	Mechanical

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>MEM23109A Apply engineering mechanics principles</i>			
MEM23071A Select and apply mechanical methods, processes and construction techniques		Not carried forward. Content incorporated into MEM14089A Not equivalent	MEM60112 MEM50212	Mechanical
MEM14082A Apply mechatronic engineering fundamentals to support design	MEM14090A Integrate mechatronic fundamentals into an engineering task <i>MEM23004A Apply technical mathematics</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i> <i>MEM23112A Investigate electrical and electronic controllers in engineering applications</i>	Not equivalent	MEM60112 MEM50212	Mechatronic
MEM23072A Select and apply mechatronic methods, processes and construction techniques		Not carried forward. Content incorporated into MEM14090A Not equivalent	MEM60112 MEM50212	Mechatronic
	MEM14091A Integrate manufacturing fundamentals into an engineering task <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112 MEM50212	Manufacturing

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	MEM14092A Integrate maintenance fundamentals into an engineering task <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112 MEM50212	Maintenance
MEM22003A Manage engineering resources	MEM22012A Coordinate resources for an engineering project or operation	Not equivalent	MEM60112 MEM50212	All
MEM22004A Manage engineering projects	MEM22013A Coordinate engineering projects	Not equivalent	MEM60112 MEM50212	All
MEM22005A Manage engineering operations	MEM22014A Coordinate engineering-related manufacturing operations <i>MEM23004A Apply technical mathematics</i> <i>MEM14091A Integrate manufacturing fundamentals into an engineering task</i>	Not equivalent	MEM60112 MEM50212	All
MEM22006A Source and estimate materials	MEM22015A Source and estimate engineering materials requirements	Not equivalent	MEM60112 MEM50212 MEM50311 MEM60211	All
MEM22008A Manage change and technical development	MEM22017A Coordinate continuous improvement and technical development	Not equivalent	MEM60112 MEM50212	All

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
MEM22009A Manage technical sales and promotion	MEM22018A Coordinate sales and promotion of engineering-related products or services	Not equivalent	MEM60112 MEM50212	All
MEM23001A Apply advanced mathematical techniques in a manufacturing engineering or related environment	MEM23004A Apply technical mathematics	Not equivalent	MEM60112 MEM50212	All
	MEM23005A Apply statistics and probability techniques to engineering tasks <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112	All
	MEM23006A Apply fluid and thermodynamics principles in engineering <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112 MEM50212	Mechanical Maintenance HVAC/R
MEM23002A Apply calculus in engineering situations	MEM23007A Apply calculus to engineering tasks <i>MEM23004A Apply technical mathematics</i>	Not equivalent	MEM60112 MEM50212	All
	MEM23008A Apply advanced algebra and numerical methods to engineering tasks	New unit	MEM60112	All

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>MEM23004A Apply technical mathematics</i>			
MEM23061A Select and test mechanical engineering materials	MEM23063A Select and test mechanical engineering materials <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>	Not equivalent	MEM80112 MEM60112 MEM50212	Mechanical
MEM23062A Select and test mechatronic engineering materials	MEM23064A Select and test mechatronic engineering materials <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>	Not equivalent	MEM80112 MEM60112 MEM50212	Mechatronic
MEM23085A Apply scientific principles and techniques in avionic engineering situations	MEM23086A Apply scientific principles and techniques in avionic engineering situations	Equivalent	MEM60112	
	MEM23109A Apply engineering mechanic principles <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112 MEM50212	Mechanical
MEM23041A Apply basic scientific principles and techniques in		Unit not carried forward. Content covered by other	MEM80112 MEM60112	

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
mechanical engineering situations		units.	MEM50212	
MEM23051A Apply basic electro and control scientific principles and techniques	MEM23111A Select electrical equipment and components for engineering applications <i>MEM23004A Apply technical mathematics</i>	Not equivalent	MEM80112 MEM60112 MEM50212	Mechatronics
MEM23051A Apply basic electro and control scientific principles and techniques	MEM23112A Investigate electrical and electronic controllers in engineering applications <i>MEM23004A Apply technical mathematics</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i>	Not equivalent	MEM80112 MEM60112 MEM50212	Mechatronics
MEM23081A Apply scientific principles and techniques in mechanical engineering situations	MEM23113A Evaluate hydrodynamic systems and system components <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>	Replaced by three units Not equivalent	MEM80112 MEM60112	Mechanical
	MEM23114A Evaluate thermodynamic systems and components <i>MEM23004A Apply</i>			

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>technical mathematics</i> MEM23006A Apply <i>fluid and thermodynamics principles in engineering</i>			
	MEM23115A Evaluate fluid power systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>			
MEM23082A Apply scientific principles and techniques in mechatronic engineering situations	MEM23116A Evaluate programmable logic controller and related control system component applications <i>MEM23004A Apply technical mathematics</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i> <i>MEM23112A Investigate electrical and electronic controllers in engineering applications</i>	Replaced by two units. Not equivalent	MEM80112 MEM60112	Mechatronics
	MEM23117A Evaluate microcontroller applications <i>MEM23004A Apply</i>			

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>technical mathematics</i> MEM23111A <i>Select electrical equipment and components for engineering applications</i> MEM23112A <i>Investigate electrical and electronic controllers in engineering applications</i>			
MEM23083A Apply industrial engineering principles and techniques in competitive manufacturing engineering situations	MEM23118A <i>Apply production and service control techniques</i> MEM30012A <i>Apply mathematical techniques in a manufacturing engineering or related environment</i>	Replaced by two units Not equivalent	MEM80112 MEM60112	Manufacturing
	MEM23119A <i>Evaluate continuous improvement processes</i> MEM30012A <i>Apply mathematical techniques in a manufacturing engineering or related environment</i> MEM23118A <i>Apply production and service control techniques</i>			
MEM23091A Apply mechanical system design principles and techniques in mechanical engineering situations	MEM23120A <i>Select mechanical machine and equipment components</i> MEM23004A <i>Apply technical mathematics</i> MEM23109A <i>Apply</i>	Replaced by two units Not equivalent	MEM80112 MEM60112	Mechanical

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>engineering mechanic principles</i>			
	MEM23121A Analyse loads on frames and mechanisms			
	<i>MEM23004A Apply technical mathematics</i>			
	<i>MEM23109A Apply engineering mechanic principles</i>			
	<i>MEM23007A Apply calculus to engineering tasks</i>			
MEM23092A Apply automated systems principles and techniques in engineering situations	MEM23122A Evaluate computer integrated manufacturing systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23111A Select electrical equipment and components for engineering applications</i> <i>MEM23112A Investigate electrical and electronic controllers in engineering applications</i>	Not equivalent	MEM80112 MEM60112	Mechatronics Manufacturing
MEM23093A Apply plant and process design principles and techniques	MEM23123A Evaluate manufacturing processes	Not equivalent	MEM80112 MEM60112	Manufacturing
MEM23094A Apply maintenance systems principles and techniques	MEM23124A Measure and analyse noise and vibration	Replaced by two units Not equivalent	MEM80112 MEM60112	Mechanical

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<p><i>MEM23004A Apply technical mathematics</i></p> <p>MEM23125A Evaluate maintenance systems</p> <p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM14092A Integrate maintenance fundamentals into an engineering task</i></p> <p><i>MEM14088A Apply maintenance engineering techniques to equipment and component repairs and modifications</i></p>			
	<p>MEM23126A Evaluate industrial robotic applications</p> <p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM23116A Evaluate programmable logic controller applications</i></p> <p><i>MEM23117A Evaluate microcontroller applications</i></p> <p><i>MEM23111A Select electrical equipment and components for engineering applications</i></p> <p><i>MEM23112A Investigate electrical and electronic controllers in</i></p>	New unit	MEM60112	Mechanical Manufacturing

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>engineering applications</i>			
	<p>MEM23129A Evaluate thermal loads in heating, ventilation, air conditioning and refrigeration</p> <p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM23006A Apply fluid and thermodynamics principles in engineering</i></p>	New unit	MEM60112	HVAC/R
	<p>MEM23130A Coordinate servicing and fault-finding of HVAC/R control systems</p> <p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM23006A Apply fluid and thermodynamics principles in engineering</i></p>	New unit	MEM60112	HVAC/R
	<p>MEM23131A Evaluate rapid prototyping applications</p> <p><i>MEM23004A Apply technical mathematics</i></p>	New unit	MEM60112	Manufacturing
	MEM23132A Evaluate rapid manufacturing processes	New unit	MEM60112	Manufacturing

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>MEM23004A Apply technical mathematics</i>			
	MEM23133A Evaluate rapid tooling applications <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112	Mechanical Manufacturing
	MEM23134A Evaluate jigs and fixtures <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>	New unit	MEM60112	Mechanical Manufacturing
	MEM23135A Evaluate moulding tools and processes <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112	Manufacturing
	MEM23136A Evaluate stamping and forging tools <i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>	New unit	MEM60112	Manufacturing Mechanical
	MEM23137A Evaluate rolling tools and processes	New unit	MEM60112	Manufacturing Mechanical

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>MEM23004A Apply technical mathematics</i> <i>MEM23109A Apply engineering mechanic principles</i>			
	MEM23138A Evaluate suitability of materials for engineering-related applications <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112	All
	MEM23139A Design a basic single zone duct distribution system <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements</i> <i>MEM30033A Use computer-aided design (CAD) to create and display 3-D models</i>	New unit	MEM50212	HVAC/R
	MEM23140A Determine operational parameters for building HVAC hydronic systems	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>			
	MEM23141A Complete a building thermal performance survey <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23142A Determine psychrometric processes and system performance</i>	New unit	MEM60112	HVAC
	MEM23142A Determine psychrometric processes and system performance <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>	New unit	MEM50212	HVAC/R
	MEM23143A Apply energy management principles <i>MEM23004A Apply</i>	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>			
	MEM23144A Contribute to the design of a commercial refrigeration system <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23129A Evaluate thermal loads in heating, ventilation, air conditioning and refrigeration</i>	New unit	MEM60112	HVAC/R
	MEM23145A Apply codes and regulations to air conditioning designs <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23140A Determine operational parameters for building HVAC hydronic systems</i> <i>MEM23142A Determine</i>	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>psychrometric processes and system performance</i>			
	MEM23146A Contribute to the design of industrial refrigeration systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>	New unit	MEM60112	HVAC/R
	MEM23147A Contribute to the design of hydronic systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23140A Determine operational parameters for building HVAC hydronic systems</i>	New unit	MEM60112	HVAC/R
	MEM23148A Develop energy management solutions <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics</i>	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<i>principles in engineering</i> <i>MEM23142A Apply psychrometric processes and system performance</i> <i>MEM23143A Apply energy management principles</i> <i>MEM23154A Analyse and service HVAC/R control systems</i>			
	MEM23149A Contribute to the design of commercial and industrial exhaust systems <i>MEM23004A Apply technical mathematics</i>	New unit	MEM60112	HVAC/R
	MEM23150A Contribute to the design of heating systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23140A Determine operational parameters for building HVAC hydronic systems</i> <i>MEM23147A Contribute to the design of hydronic systems</i>	New unit	MEM60112	HVAC
	MEM23151A	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	Commission and optimise performance of HVAC/R systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i> <i>MEM23140A Determine operational parameters for building HVAC hydronic systems</i> <i>MEM23154A Analyse and service HVAC/R control systems</i>			
	MEM23152A Apply principles of refrigeration food storage technology	New unit	MEM50212	HVAC/R
	MEM23153A Contribute to the design of heat exchanger systems <i>MEM23004A Apply technical mathematics</i> <i>MEM23006A Apply fluid and thermodynamics principles in engineering</i>	New Unit	MEM60112	HVAC/R
	MEM23154A Analyse and service HVAC/R systems	New unit	MEM50212	HVAC/R

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	<p><i>MEM23004A Apply technical mathematics</i></p> <p><i>MEM23006A Apply fluid and thermodynamics principles in engineering</i></p>			
	<p>MEM234036A Apply configuration management procedures in engineering project management</p> <p><i>MEM23003A Operate and program computers and/or controllers in engineering situations</i></p> <p><i>MEM234028A Produce and manage technical documentation</i></p> <p><i>MEM234029A Produce and manage technical publications</i></p>	New unit	MEM80112	
	<p>MEM234037A Perform maintenance-related integrated logistic support management activities</p> <p><i>MEM23003A Operate and program computers and/or controllers in engineering situations</i></p> <p><i>MEM234028A Produce and manage technical documentation</i></p> <p><i>MEM234029A Produce and manage technical publications</i></p>	New unit	MEM80112	

MEM05v8 unit	MEM05v9 unit code	Comment/ equivalence	Packaging	Discipline
	MEM234038A Apply systems engineering procedures to engineering design project management	New unit	MEM80112	
	MEM30029A Use workshop equipment and processes to complete an engineering project	New unit	MEM60112	All

MEM units not carried forward in MEM05v9

MEM09141A Represent mechanical engineering designs graphically
MEM09142A Represent mechatronic engineering designs graphically
MEM09151A Apply computer aided modelling and data management techniques to mechanical engineering designs
MEM09152A Apply CAD modelling and data management techniques to mechatronic engineering designs
MEM14061A Plan and design mechanical engineering projects
MEM14062A Plan and design mechatronic engineering projects
MEM14063A Plan and design manufacturing engineering projects
MEM14064A Plan and design maintenance engineering projects
MEM14081A Apply mechanical engineering fundamentals to support design and development of projects
MEM14082A Apply mechatronic engineering fundamentals to support design and development of projects
MEM22003A Manage engineering resources
MEM22004A Manage engineering projects
MEM22005A Manage engineering operations

MEM22006A Source and estimate materials
MEM22008A Manage change and technical development
MEM22009A Manage technical sales and promotion
MEM23001A Apply advanced mathematical techniques in a manufacturing, engineering or related environment
MEM23002A Apply calculus in engineering situations
MEM23041A Apply basic scientific principles and techniques in mechanical engineering situations
MEM23051A Apply basic electro and control scientific principles and techniques
MEM23061A Select and test mechanical engineering materials
MEM23062A Select and test mechatronic engineering materials
MEM23071A Select and apply mechanical methods, processes and construction techniques
MEM23072A Select and apply mechatronic methods, processes and construction techniques
MEM23081A Apply scientific principles and techniques in mechanical engineering situations
MEM23082A Apply scientific principles and techniques in mechatronic engineering situations
MEM23083A Apply industrial engineering principles and techniques in competitive manufacturing engineering situations
MEM23085A Apply scientific principles and techniques in avionic engineering situations
MEM23091A Apply mechanical system design principles and techniques in mechanical engineering situations
MEM23092A Apply automated systems principles and techniques in engineering situations
MEM23093A Apply plant and process design principles and techniques in engineering situations
MEM23094A Apply maintenance systems principles and techniques in engineering situations

MEM05v8 - Mapping of Changes

Changes to qualifications

MEM05v7 Code	MEM05v8 Code	Title	Comment
	MEM40412	Certificate IV in Engineering Drafting	New qualification
MEM30505	MEM30505	Certificate III in Engineering – Technical	Additional and replacement electives – equivalent
MEM50211	MEM50211	Diploma of Engineering – Technical	Additional and replacement electives - equivalent
MEM50311	MEM50311	Diploma of Jewellery and Object Design	Replacement of one elective unit - equivalent
MEM60111	MEM60111	Advanced Diploma of Engineering	Additional and replacement electives - equivalent
MEM60211	MEM60211	Advanced Diploma of Jewellery and Object Design	Replacement of one elective unit - equivalent

Qualifications – packaging of new electives

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
MEM09201A Work effectively in an engineering drafting workplace	X	X				
MEM09202A Produce freehand sketches	X	X	X			
MEM09203A	X	X	X			

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
Measure and sketch site information						
MEM09204A Produce basic engineering detail drawings		X	X		X	
MEM09205A Produce electrical schematic drawings	X	X	X		X	
MEM09206A Produce drawings for mechanical services		X	X			
MEM09207A Produce drawings for reticulated services		X	X			
MEM09208A Detail fasteners and locking devices in mechanical drawings	X	X	X			
MEM09209A Detail bearings, seals	X	X	X			

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
and other componentry in mechanical drawings						
MEM09210A Create 3-D solid models using computer-aided design (CAD) system		X	X			
MEM09211A Produce drawings or models for industrial piping		X	X			
MEM09212A Produce detailed drawings of steel to non-steel connections		X	X			
MEM09213A Produce schematic drawings for hydraulic and pneumatic fluid power systems	X	X	X			
MEM09214A Perform			X			

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
advanced engineering detail drafting						
MEM09215A Manage detail drafting projects			X			
MEM09216A Interpret and produce curved 3-D shapes and patterns		X	X			
MEM09217A Prepare plans for pipe and duct fabrication		X	X			
MEM09218A Participate in drafting projects for building services		X	X			
MEM09219A Prepare drawings for fabricated sheet metal products		X	X			
MEM09220A Apply surface modelling		X	X			

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
techniques to 3-D drawings						
MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system		X	X			
MEM09222A Interpret and maintain or restore original drawings			X			
MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements	X	X	X	X	X	X
MEM30032A Produce basic engineering drawings	X	X	X		X	
MEM30033A Use computer-aided design (CAD) to create and	X	X	X		X	

Unit	MEM30505 Certificate III in Engineering - Technical	MEM40412 Certificate IV in Engineering Drafting	MEM50211 Diploma of Engineering - Technical	MEM50311 Diploma of Jewellery and Object Design	MEM60111 Advanced Diploma of Engineering	MEM60211 Advanced Diploma of Jewellery and Object Design
display 3-D models						

Mapping of new CAD units to previous CAD units

Note: These changes only apply to the following qualifications:

- MEM30505 Certificate III in Engineering – Technical
- MEM50211 Diploma of Engineering – Technical
- MEM50311 Diploma of Jewellery and Object Design
- MEM60111 Advanced Diploma of Engineering
- MEM60211 Advanced Diploma of Jewellery and Object Design

Existing units remain packaged in the following qualifications:

- MEM30705 Certificate III in Marine Craft Construction
- MEM40105 Certificate IV in Engineering
- MEM50105 Diploma of Engineering – Advanced Trade

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
MEM09201A Work effectively in an engineering drafting workplace		New unit. Covers skills related to working in drafting and understanding the role of drafting across industries and in various applications.
MEM09202A Produce freehand sketches		New unit. Covers freehand sketching skills and standard drawing conventions and techniques.
MEM09203A Measure and sketch site information		New unit. Covers skills to take onsite measurements, perform calculations and sketch site information to inform drafting work.
MEM09204A	MEM09003B Prepare	Not equivalent. This unit is aimed at

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
Produce basic engineering detail drawings <u>Prerequisite:</u> MEM09002B Interpret technical drawing	basic engineering drawing	general detail drafting across all sectors and forms the base level detail drafting skill upon which further drafting specialisation or advanced drafting skills are developed. Covers preparation of detail 2-D drawings to AS 1100.
MEM09205A Produce electrical schematic drawings <u>Prerequisites:</u> MEM09002B Interpret technical drawing MEM09204A Produce basic engineering detail drawings	MEM09004B Perform electrical/electronic detail drafting	Not equivalent. This unit targets specialist electrical detail drafting skills. Unit more comprehensively details electrical/electronic schematic drawing skills than MEM09004B.
MEM09206A Produce drawings for mechanical services <u>Prerequisites:</u> MEM09002B Interpret technical drawing MEM09204A Produce basic engineering detail drawings		New unit. Covers specialised detail drafting skills for mechanical services.
MEM09207A Produce drawings for reticulated services <u>Prerequisites:</u> MEM09205A Produce basic engineering detail drawings MEM09002B		New unit. Covers specialised detail drafting skills for reticulated services. Unit also covers selecting pipe and duct fabrication methods

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
Interpret technical drawing		
<p>MEM09208A Detail fasteners and locking devices in mechanical drawings</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09205A Produce basic engineering detail drawings</p>		New unit. Covers specialised detail drafting skills.
<p>MEM09209A Detail bearings, seals and other componentry in mechanical drawings</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09204A Produce basic engineering detail drawings</p>		New unit. Covers specialised detail drafting skills.
<p>MEM09210A Create 3-D solid models using computer-aided design (CAD) system</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM30031A Operate computer-aided design (CAD) system to produce basic</p>	MEM09010C Create 3-D solid models using computer-aided design (CAD) system	Not equivalent. The new unit extends and updates 3-D modelling skills.

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
drawing elements		
<p>MEM09211A Produce drawings or models for industrial piping</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09204A Produce basic engineering detail drawings</p>		New unit. Covers specialised detail drafting skills.
<p>MEM09212A Produce detailed drawings of steel to non-steel connections</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09204A Produce basic engineering detail drawings</p>		New unit. Covers specialised detail drafting skills.
<p>MEM09213A Produce schematic drawings for hydraulic and pneumatic fluid power systems</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing engineering detail drawings</p> <p>MEM09204A Produce basic engineering detail</p>		New unit. Covers specialised detail drafting skills.

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
drawings		
<p>MEM09214A Perform advanced engineering detail drafting</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09204A Produce basic engineering detail drawings</p> <p>MEM30012A Apply mathematical techniques in a manufacturing, engineering or related environment</p>		<p>New unit. Covers advanced detail drafting skills including tolerancing and dimensioning. Also includes extended skills in the use of CAD systems.</p> <p>Based on, extends and replaces MEM09006A and MEM09007B. Not equivalent.</p>
<p>MEM09215A Supervise detail drafting projects</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM09204A Produce basic engineering detail drawings</p> <p>MEM09214A Perform advanced engineering detail drafting</p> <p>MEM30012A Apply mathematical techniques in a manufacturing, engineering or related</p>		<p>New unit. Covers management of drafting projects.</p>

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
environment MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements		
MEM09216A Interpret and produce curved 3-D shapes and patterns	MEM09021B Interpret and produce curved 3-dimensional shapes	New unit, based on MEM09021B. Not equivalent – content extended and updated.
MEM09217A Prepare plans for pipe and duct fabrication <u>Prerequisite:</u> MEM09002B Interpret technical drawing		New unit.
MEM09218A Participate in drafting projects for building services <u>Prerequisites:</u> MEM09002B Interpret technical drawing MEM09204A Produce basic engineering detail drawings		New unit.
MEM09219A Prepare drawings for fabricated sheet metal products <u>Prerequisite:</u> MEM09002B Interpret technical drawing		New unit.

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
<p>MEM09220A Apply surface modelling techniques to 3-D drawings</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements</p>		New unit.
<p>MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system</p> <p><u>Prerequisites:</u></p> <p>MEM09002B Interpret technical drawing</p> <p>MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements</p>		New unit.
<p>MEM09222A Interpret and maintain or restore original drawings</p> <p><u>Prerequisite:</u></p> <p>MEM30032A Produce basic engineering drawings</p>		New unit.
<p>MEM30031A Operate computer-aided</p>	<p>MEM30001A Use computer aided drafting systems to produce basic</p>	<p>Based on MEM30001A but not equivalent.</p> <p>This unit covers introductory CAD</p>

MEM05v8 - NEW UNITS	MEM05 PREVIOUS UNITS	COMMENTS
design (CAD) system to produce basic drawing elements	engineering drawings	operations skills, with an emphasis on CAD operations required for producing detail drawings. It forms the starting base for CAD drafting skills and does not require completion of a detail drawing to AS1100. Completion of a basic detail drawing to AS1100 is covered in new unit MEM30032A Produce basic engineering drawings. Also includes computer coverage from MEM16008A.
MEM30032A Produce basic engineering drawings		New unit, based on a merger of MEM30002A and MEM30003A. Not equivalent.
MEM30033A Use computer-aided design (CAD) to create and display 3-D models <u>Prerequisite:</u> MEM30031A Operate CAD system to produce basic drawing elements	MEM30004A Use computer-aided design (CAD) to create and display 3-D models	New unit, based on MEM30004A but not equivalent. Covers introductory 3-D modelling skills.

Existing MEM units not carried forward

MEM30001A Use computer aided drafting systems to produce basic engineering drawings	Replaced by MEM30031A
MEM30002A Produce basic engineering graphics	Not carried forward. Content covered in MEM30032A.
MEM30003A Produce detailed engineering drawings	Not carried forward. Content covered in MEM30032A.
MEM30004A Use CAD to create and display 3D models	Replaced by MEM30033A.

Additional imported units of competency

Unit code	Unit title
CPCCOHS1001A	Work safely in the construction industry
CPCPCM4002A	Estimate and cost work
CPPBDN5013A	Develop and collaborate on building information models for small-scale building design projects
FDFOP2005A	Work in a socially diverse environment
LMTGN4002A	Participate in product engineering
MSACMS201A	Sustain process improvements
MSACMT251A	Apply quality standards
MSATCS301A	Interpret architectural and 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
MSATCS504A	Detail ancillary steelwork
UEPMNT419A	Perform Civil Drafting

Imported units of competency - version changes

MEA105B Apply quality standards applicable to aviation maintenance processes	Replaced by MEA105C Apply quality standards applicable to aviation maintenance processes - equivalent
MEA272A Apply basic scientific principles and techniques in avionic engineering situations	Replaced by MEA272B Apply basic scientific principles and techniques in avionic engineering situations - equivalent
MEA349A Apply basic scientific principles and techniques in aeronautical	Replaced by MEA349B Apply basic scientific principles and techniques in aeronautical

engineering situations	engineering situations - equivalent
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MEM05v7 - Mapping of Changes

Changes to qualifications

MEM05v6 Code	MEM05v7 Code	Title	Comment
MEM20105	MEM20105	Certificate II in Engineering	One additional elective - equivalent
MEM20205	MEM20205	Certificate II in Engineering – Production Technical	One additional elective - equivalent
MEM30105	MEM30105	Certificate III in Engineering – Production Systems	Additional electives – equivalent
MEM30205	MEM30205	Certificate III in Engineering – Mechanical Trade	Additional electives added to trade specialisation list – equivalent
MEM30305	MEM30305	Certificate III in Engineering – Fabrication Trade	Additional electives added to trade specialisation list – equivalent
	MEM31112	Certificate III in Engineering (Composites Trade)	New qualification
MEM50105	MEM50105	Diploma in Engineering – Advanced Trade	Typographic error corrected in advice re minimum requirements for holders of other MEM qualifications.

New Units of competency

Unit code	Unit title	Quals affected
<i>Composites</i>		

MEM26001 A	Lay up composites using open moulding techniques	MEM30105, 30205 & 30305
MEM26002 A	Lay up composites using vacuum closed moulding techniques	As above
MEM26003 A	Lay up composites using pressure closed moulding techniques	As above
MEM26004 A	Make basic plugs for composites fabrication	As above
MEM26005 A	Make basic moulds for composites fabrication	As above
MEM26006 A	Mark and cut out sheets for composite use	As above
MEM26007 A	Select and use reinforcing appropriate for product	As above, plus MEM20105
MEM26008 A	Select and use resin systems appropriate for product	As above, plus MEM20105
MEM26009 A	Select and use cores and fillers appropriate for product	As above, plus MEM20105
MEM26010 A	Store and handle composite materials	MEM30105, 30205 & 30305
MEM26011 A	Determine materials and techniques for a composite component or product*	As above
MEM26012 A	Record and trial work processes for one-off composite products	As above
MEM26013 A	Select and use composite processes or systems appropriate for product	As above
MEM26014 A	Adjust resin chemicals for current conditions	As above
MEM26015 A	Select and apply repair techniques	As above
MEM26016 A	Select and use joining techniques	As above

New Units of competency

Unit code	Unit title	Quals affected
<i>Composites</i>		
MEM26001 A	Lay up composites using open moulding techniques	MEM30105, 30205 & 30305
MEM26017 A	Prepare composite or other substrate surfaces	As above
MEM26018 A	Organise composite trials	As above
MEM26019 A	Finish a composite product	As above
MEM26020 A	Identify and interpret required standards for composites	As above
<i>Aluminothermic welding</i>		
MEM05027 A	Perform aluminothermic welding	MEM20105, 20205, 30105, 30205, 30305

MEM05v6 - Mapping of Changes

New qualifications

Code	Title	Comment
MEM40311	Certificate IV in Advanced Jewellery Manufacture	New qualification
MEM80111	Advanced Graduate Diploma of Engineering	New qualification

New Units of competency

Unit code	Unit title	Prerequisites
MEM19044A	Repair and restore antique jewellery	
MEM19045A	Set gems in channel style settings	
MEM19046A	Apply grain setting techniques	
MEM19047A	Set gems in claw and bezel style settings	
MEM19048A	Develop and apply complex borders and decorations for hand engraving	
MEM19049A	Develop and apply heraldic designs for hand engraving	
MEM19050A	Hand carve engraving work	
MEM19051A	Construct multiple stone settings	MEM19047A MEM19045A
MEM19052A	Produce complex objects using silversmithing techniques	MEM19033A
MEM19053A	Create complex findings and mechanisms for jewellery items	
MEM19054A	Fabricate platinum jewellery items	
MEM234001A	Plan and manage engineering-related projects or operations	
MEM234002A	Integrate engineering technologies	
MEM234003A	Design machines and ancillary equipment	
MEM234004A	Design for engineering-related noise and vibration mitigation	
MEM234005A	Design hydrodynamic pumping systems	
MEM234006A	Evaluate and select thermodynamic systems or sub-systems	
MEM234007A	Design fluid power systems	

MEM234008A	Design plant using computer simulations	
MEM234009A	Design computer-integrated manufacturing systems	
MEM234010A	Design microcontroller applications	
MEM234011A	Design programmable logic controller applications	
MEM234012A	Design integrated maintenance management systems	
MEM234013A	Plan and design engineering-related manufacturing processes	
MEM234014A	Design a robotic system	
MEM234015A	Design hydronic heat exchanger systems	
MEM234016A	Design refrigeration systems	
MEM234017A	Design exhaust, ventilation and dust collection systems	
MEM234018A	Design heating, ventilation, air conditioning and refrigeration control systems	
MEM234019A	Apply finite element analysis in engineering design	
MEM234020A	Coordinate small lot manufacture using rapid manufacture processes	
MEM234021A	Apply statistics to technology problems	
MEM234022A	Apply advanced calculus to technology problems	
MEM234023A	Apply differential equations to technology problems	
MEM234024A	Apply advanced mathematics in technology problems	
MEM234025A	Apply numerical methods to technology problems	
MEM234026A	Develop and coordinate engineering-related	

	contingency plans	
MEM234027A	Plan and manage materials supply for an engineering project or manufacturing operation	
MEM234028A	Produce and manage technical documentation	
MEM234029A	Produce and manage technical publications	
MEM234030A	Provide specialised technical and engineering guidance to other technical employees	
MEM234031A	Manage installation, commissioning or modification of machines and equipment	
MEM234032A	Manage fluid power related technologies in an enterprise	
MEM234033A	Lead engineering-related quality operations in an enterprise	
MEM234034A	Manage heating, ventilation, air conditioning and refrigeration systems or projects	
MEM234035A	Maintain and apply technical and engineering skills	

New imported units

Unit code	Unit title	Prerequisites
BSBLED705A	Plan and implement a mentoring program	
BSBLED706A	Plan and implement a coaching strategy	
BSBLED710A	Develop human capital	
BSBREL701A	Develop and cultivate collaborative partnerships and relationships	
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 internal 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	
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	

MSACMS606A	Introduce competitive manufacturing to a small or medium enterprise	
MSACMT620A	Develop quick changeover procedures	
MSACMT622A	Design a process layout	
MSACMT623A	Develop a levelled pull system of manufacturing	
MSACMT632A	Analyse cost implications of maintenance strategy	
MSAENV672B	Develop workplace policy and procedures for sustainability	
MSL976003A	Evaluate and select appropriate test methods and procedures	

MEM05v5 - Mapping of Changes

New qualifications

Code	Title	Comment
MEM50311	Diploma of Jewellery and Object Design	New qualification
MEM60211	Advanced Diploma of Jewellery and Object Design	New qualification

Units of competency (MEM50311 and MEM60211)

P = prerequisites

E = existing MEM unit

N = new MEM unit

NI = new imported unit (*where marked with an asterisk, unit to be endorsed in CUV11)

EI = existing imported unit

MEM05v5		MEM05v4		Relationship to previous version
MEM05006C	Perform brazing and/or	MEM05006B	Perform brazing and/or	Corrections to descriptor and range to clarify inclusion of

	silver soldering		silver soldering	'brazing welding' - equivalent
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Unit code	Unit title	P	Status	Diploma	Advanced Diploma
MEM05006C	Perform brazing and/or silver soldering		E	Y	Y
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing		E	Y	Y
MEM08010B	Manually finish/polish materials	MEM18001C	E	Y	Y
MEM09002B	Interpret technical drawing		E	Y	Y
MEM12023A	Perform engineering measurements		E	Y	Y
MEM12024A	Perform computations		E	Y	Y
MEM13003B	Work safely with industrial chemicals and materials		E	Y	Y
MEM13004B	Work safely with molten metals/glass		E	Y	Y
MEM13014A	Apply principles of occupational health and safety in the work environment		E	Y	Y
MEM16006A	Organise and communicate information		E	Y	Y
MEM16008A	Interact with computing technology		E	Y	Y
MEM18001C	Use hand tools		E	Y	Y
MEM18002B	Use power tools/hand held operations		E	Y	Y
MEM18003C	Use tools for precision work	MEM12023A MEM18001C	E	Y	Y

		MEM18002B			
MEM19001B	Perform jewellery metal casting	MEM13004B	E	Y	Y
MEM19012B	Produce jewellery wax model	MEM18001C MEM18002B MEM18003C	E	Y	Y
MEM19013B	Produce jewellery metal masters	MEM08010B MEM13004A MEM16006A MEM19001B	E	Y	Y
MEM19023A	Apply drawing and rendering techniques to jewellery or object design		N	Y	Y
MEM19024A	Use CAD to create and display 3D jewellery and object models		N	Y	Y
MEM19025A	Create and present designs for jewellery and other 3D objects		N	Y	Y
MEM19026A	Investigate quality and application of jewellery materials		N	Y	Y
MEM19027A	Produce life drawings for presenting jewellery and object designs	MEM19023A	N	Y	Y
MEM19028A	Select materials and new technologies for jewellery and 3D object design applications		N	Y	Y
MEM19029A	Produce a professional jewellery design and 3D object portfolio		N	Y	Y
MEM19030A	Research and design sustainable objects		N	Y	Y
MEM19031A	Produce renderings and		N	Y	Y

	technical drawings for jewellery and object design construction				
MEM19032A	Design and implement mechanisms in jewellery items		N	Y	Y
MEM19033A	Create silversmithing objects		N	Y	Y
MEM19034A	Apply chain manufacture process		N	Y	Y
MEM19035A	Plan and apply casting techniques for jewellery and object designs		N	Y	Y
MEM19036A	Use specialised techniques to produce jewellery and objects		N	Y	Y
MEM19037A	Plan and implement chenier fabrication process		N	Y	Y
MEM19038A	Apply traditional techniques to jewellery and 3D object production		N		Y
MEM19039A	Plan, conduct and supervise a jewellery and object exhibition		N		Y
MEM19040A	Create and manufacture jewellery or object design prototypes for the mass market		N		Y
MEM19041A	Experiment with jewellery or object designs		N		Y
MEM19042A	Render images using computer graphics software	MEM19024A	N	Y	Y
MEM19043A	Oversee jewellery or object design production		N		Y
MEM22006A	Source and estimate materials		E	Y	Y

MEM30001A	Use computer aided drafting systems to produce basic engineering drawings	MEM16006A MEM16008A	E	Y	Y
Imported units					
BSBCMM401A	Make a presentation		NI	Y	Y
BSBCRT401A	Articulate, present and debate ideas		NI	Y	Y
BSBCRT402A	Collaborate in a creative process		NI	Y	Y
BSBCRT501A	Originate and develop concepts		NI	Y	Y
BSBCRT601A	Research and apply concepts and theories of creativity		NI		Y
BSBDES402A	Interpret and respond to a design brief		NI	Y	Y
BSBDES502A	Establish, negotiate and refine a design brief		NI	Y	Y
BSBDES601A	Manage design realisation		NI		Y
BSBDES602A	Research global design trends		NI		Y
BSBDES701A	Research and apply design theory		NI		Y
BSBIPR401A	Use and respect copyright		NI	Y	Y
BSBIPR501A	Manage intellectual property to protect and grow business		NI	Y	Y
BSBPMG510A	Manage projects		NI	Y	Y
BSBSMB403A	Market the small business		NI	Y	Y
BSBSMB405A	Monitor and manage small business operations		NI	Y	Y

BSBSMB406A	Manage small business finances		NI	Y	Y
CUFIND201A	Develop and apply creative arts industry knowledge		NI	Y	Y
CUFRES401A	Conduct research		NI	Y	Y
CUVACD304A	Make scale models		*NI	Y	Y
CUVACD504A	Research and apply light and colour		*NI	Y	Y
CUVACD506A	Refine 2-D design ideas and processes		*NI	Y	Y
CUVACD507A	Refine 3-D design ideas and processes		*NI	Y	Y
CUVACD512A	Work with photomedia in creative practice		*NI	Y	Y
CUVACD601A	Extend professional expertise with drawing and other visual representation tools		*NI		Y
CUVDES403A	Research and apply techniques for the design of wearable objects		*NI	Y	Y
CUVDIG401A	Experiment with techniques to enhance digital images		*NI	Y	Y
CUVDIG501A	Refine digital art techniques		*NI	Y	Y
CUVDRA501A	Refine drawing techniques		*NI	Y	Y
CUVDRA502A	Investigate drawing materials and processes		*NI	Y	Y
CUVGRD301A	Prepare files for publication		*NI	Y	Y
CUVJWL401A	Experiment with techniques to produce jewellery		*NI	Y	Y
CUVPHI302A	Capture photographic images		*NI	Y	Y

CUVPHI403A	Apply photo imaging lighting techniques		*NI	Y	Y
CUVPRP403A	Select and organise finished work for storage		*NI	Y	Y
CUVPRP405A	Develop and discuss ideas for own creative work		*NI	Y	Y
CUVPRP501A	Realise a body of creative work		*NI	Y	Y
CUVPRP502A	Prepare for sustainable professional practice		*NI	Y	Y
CUVPRP503A	Present a body of own creative work		*NI	Y	Y
CUVPRP601A	Originate a body of independent creative work		*NI		Y
CUVPRP602A	Collaborate in professional creative projects		*NI		Y
CUVPRP603A	Engage in the business of creative practice		*NI		Y
CUVPRP604A	Publicly present a body of own creative work		*NI		Y
CUVRES502A	Analyse cultural history and theory		*NI	Y	Y
CUVRES601A	Extend cultural research expertise		*NI		Y
LMFFDT4012A	Produce ideation drawings		NI	Y	Y
MSAENV272B	Participate in environmentally sustainable work practices		EI	Y	Y
MSAENV472B	Implement and monitor environmentally sustainable work practices		EI	Y	Y
SIRXSLS001A	Sell products and services		NI	Y	Y

MEM05v4 - Mapping of Changes

Qualifications mapping

Revised qualifications

MEM05v3		MEM05v4		Comment
MEM50205	Diploma of Engineering - Technical	MEM50211	Diploma of Engineering - Technical	Addition of new stream - RTOs will be required to extend scope if they wish to deliver the new aeronautical and avionic units of competency. All other outcomes remain equivalent.
MEM60105	Advanced Diploma of Engineering	MEM60111	Advanced Diploma of Engineering	Addition of new stream - RTOs will be required to extend scope if they wish to deliver the new aeronautical and avionic units of competency. All other outcomes remain equivalent.

Allocation of new electives to existing qualifications

Code	Title	Change - units added to the elective choice
MEM20205	Certificate II in Engineering - Production Technology	MEM11023A Operate a bridge and gantry crane MEM11024A Undertake basic rigging MEM11025A Operate a non-slewing mobile crane of greater than three tonnes capacity MEM18098A Prepare to perform work associated with fuel system installation and servicing TLILIC2001A Licence to operate a forklift truck TLILIC2002A Licence to operate an order picking forklift truck TLILIC3003A Licence to operate a bridge and gantry crane TLILIC3006A Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity) TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above) CPCCLDG3001A Licence to perform dogging

		<p>CPCCLRG3001A Licence to perform rigging basic level</p> <p>CPCCLSF2001A Licence to erect, alter and dismantle scaffolding basic</p> <p>CPCCLSF3001A Licence to erect, alter and dismantle scaffolding intermediate</p>
MEM20305	Certificate II in Boating Services	<p>TLILIC2001A Licence to operate a forklift truck</p> <p>TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)</p>
MEM30105	Certificate III in Engineering - Production Systems	<p>MEM11023A Operate a bridge and gantry crane</p> <p>MEM11024A Undertake basic rigging</p> <p>MEM11025A Operate a non-slewing mobile crane of greater than three tones capacity</p> <p>MEM18098A Prepare to perform work associated with fuel system installation and servicing</p> <p>TLILIC2001A Licence to operate a forklift truck</p> <p>TLILIC2002A Licence to operate an order picking forklift truck</p> <p>TLILIC3003A Licence to operate a bridge and gantry crane</p> <p>TLILIC3006A Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)</p> <p>TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)</p> <p>CPCCLDG3001A Licence to perform dogging</p> <p>CPCCLRG3001A Licence to perform rigging basic level</p> <p>CPCCLSF2001A Licence to erect, alter and dismantle scaffolding basic level</p> <p>CPCCLSF3001A Licence to erect, alter and dismantle scaffolding intermediate level</p>
MEM30205	Certificate III in Engineering - Mechanical Trade	<p>MEM18098A Prepare to perform work associated with fuel system installation and servicing</p>
MEM30305	Certificate III in Engineering - Fabrication Trade	<p>MEM18098A Prepare to perform work associated with fuel system installation and servicing</p>
MEM30405	Certificate III in Engineering - Electrical Trade	<p>MEM18098A Prepare to perform work associated with fuel system installation and servicing</p>
MEM30905	Certificate III in Boating Services	<p>TLILIC2001A Licence to operate a forklift truck</p> <p>TLILIC0012A Licence to operate a vehicle loading</p>

		crane (capacity 10 metre tonnes and above)
MEM40105	Certificate IV in Engineering	MEM18098A Prepare to perform work associated with fuel system installation and servicing TLILIC2001A Licence to operate a forklift truck TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)
MEM50105	Diploma of Engineering - Advanced Trade	MEM18098A Prepare to perform work associated with fuel system installation and servicing TLILIC2001A Licence to operate a forklift truck TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)
		<p>The following units have also been added to the Certificate III Trade Specialisation Units list for use if required in the qualifications listed below:</p> <p>TLILIC2001A Licence to operate a forklift truck TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above).</p> <ul style="list-style-type: none"> ▶ MEM30205 Certificate III in Engineering – Mechanical Trade ▶ MEM30305 Certificate III in Engineering – Fabrication Trade ▶ MEM30405 Certificate III in Engineering – Electrical/Electronic Trade ▶ MEM30605 Certificate III in Jewellery Manufacture ▶ MEM30705 Certificate III in Marine Craft Construction ▶ MEM30805 Certificate III in Locksmithing

Packaging of High Risk Licensing Units

High risk licensing unit	Points	Packaging information
TLILIC2001A Licence to operate a forklift truck	0	<p>This unit has been allocated no points and imported as an elective to:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM20305 Certificate II in Boating Services ▶ MEM30905 Certificate III in Boating Services ▶ MEM30105 Certificate III in Engineering –

		<p>Production Systems</p> <ul style="list-style-type: none"> ▶ MM40105 Certificate IV in Engineering ▶ MEM50105 Diploma of Engineering – Advanced Trade <p>The unit is also included in the list of Certificate III trade specialisation units.</p>
TLILIC2002A Licence to operate an order picking forklift truck	0	<p>This unit has been allocated no points and imported as an elective to:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
TLILIC3003A Licence to operate a bridge and gantry crane	0	<p>A new MEM unit has been developed and allocated 4 points to provide MEM required work outcomes for use in conjunction with the licensing unit – MEM11023A Operate a bridge and gantry crane. TLILIC3003A has been imported and allocated no points. MEM11023A and TLILIC3003A have been included as electives in:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
TLILIC0012A Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)	1	<p>Unit has been allocated 1 point and imported as an elective to the following qualifications:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM20305 Certificate II in Boating Services ▶ MEM30905 Certificate III in Boating Services ▶ MEM30105 Certificate III in Engineering – Production Systems ▶ MEM40105 Certificate IV in Engineering ▶ MEM50105 Diploma of Engineering – Advanced Trade <p>The unit has also been included in the list of Certificate III trade specialisation units.</p>
CPCCLDG3001A - Licence to perform dogging	0	<p>This unit has been allocated no points and imported as an elective to:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
CPCCLRG3001A - Licence to	0	<p>A new MEM unit has been developed and allocated 4</p>

perform rigging basic level		<p>points to provide MEM required work outcomes for use in conjunction with the licensing unit – MEM11024A Undertake basic rigging.</p> <p>CPCCLRG3001A has been imported and allocated no points. MEM11024A and CPCCLRG3001A have been included as electives in:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
CPCCLSF2001A - Licence to erect, alter and dismantle scaffolding basic level	0	<p>This unit has been allocated no points and imported as an elective to:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
CPCCLSF3001A - Licence to erect, alter and dismantle scaffolding intermediate level	0	<p>This unit has been allocated no points and imported as an elective to:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems
TLILIC3006A Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)	0	<p>A new MEM unit has been developed and allocated 4 points to provide MEM required work outcomes for use in conjunction with the licensing unit – MEM11025A Operate a non-slewing mobile crane of greater than 3 tonnes capacity.</p> <p>TLILIC3006A has been imported and allocated no points. MEM11025A and TLILIC3006A have been included as electives in:</p> <ul style="list-style-type: none"> ▶ MEM20205 Certificate II in Engineering – Production Technology ▶ MEM30105 Certificate III in Engineering – Production Systems

MEM05v4 - New units and additional imported units of competency

High risk rigging	
MEM11023A	Operate a bridge and gantry crane
MEM11024A	Undertake basic rigging
MEM11025A	Operate a non-slewing mobile crane of greater than three tonnes capacity

Fuel system installation and service	
MEM18098A	Prepare to perform work associated with fuel system installation and servicing
Aerospace	
MEM09143A	Represent aeronautical engineering designs
MEM09144A	Represent avionic engineering designs
MEM09153A	Apply computer-aided modelling and data management techniques to aeronautical engineering designs
MEM09154A	Apply computer-aided modelling and data management techniques to avionic engineering designs
MEM14065A	Plan and design aeronautical engineering projects
MEM14066A	Plan and design avionic engineering projects
MEM14083A	Apply aeronautical engineering fundamentals to support design and development of engineering projects
MEM14084A	Apply avionic engineering fundamentals to support design and development of engineering projects
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques
MEM23084A	Apply scientific principles and techniques in aeronautical engineering situations
MEM23085A	Apply scientific principles and techniques in avionic engineering situations
MEM23095A	Apply aeronautical system design principles and techniques in aeronautical engineering situations
MEM23096A	Apply avionic system design principles and techniques in avionic engineering situations
MEM23097A	Apply automated systems principles and techniques in aeronautical engineering situations
MEM23098A	Apply automated systems principles and techniques in avionic engineering situations
Imported units	
	MEA units
MEA101B	Interpret occupational health and safety practices in aviation maintenance

MEA105B	Apply quality standards applicable to aviation maintenance processes
MEA107B	Interpret and use aviation maintenance industry manuals and specifications
MEA108B	Complete aviation maintenance industry documentation
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance
MEA270A	Lay out avionic systems
MEA271A	Lay out avionic flight management systems
MEA272A	Apply basic scientific principles and techniques in avionic engineering situations
MEA273A	Select and test avionic engineering materials
MEA340A	Lay out and set up aircraft systems
MEA341A	Apply basic aircraft design characteristics
MEA342A	Apply basic aircraft power plant design characteristics
MEA349A	Apply basic scientific principles and techniques in aeronautical engineering situations
MEA350A	Select and test aeronautical engineering materials
	High Risk Licensing
CPCCLDG3001A	Licence to perform dogging
CPCCLRG3001A	Licence to perform rigging basic level
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)
TLILIC2001A	Licence to operate a forklift truck
TLILIC2002A	Licence to operate an order picking forklift truck
TLILIC3003A	Licence to operate a bridge and gantry crane
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)

MEM05v3 - Mapping of Changes

Qualifications – summary of changes

Note:

- All qualifications have been adjusted to include sustainability units of competency and to comply with the 1/3 elective and 1/6 importation requirements.
- MSAENV sustainability units added to core and/or electives – all qualifications. MSAENV472B has been included in the Certificate III Trade Specialisation list of units.
- Points allocated to MSAENV units: MSAENV272B = 3, MSAENV472B = 4.
- For points based qualifications, where MSAENV272B has been added to core units, the total elective points required have been reduced by three to accommodate inclusion of the extra unit in the core. Similarly, other qualifications have had the elective choice reduced by one unit. Note that all MEM qualifications already exceeded the requirement that at least 1/3 of the total must be electives.
- **Total points to achieve a qualification have been based on points required in industrial instruments and have not been altered.***
- All qualification outcomes remain equivalent.

Code	Title	MSAENV unit/s	MEM0 5v2 elective points/units required	MEM0 5v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
MEM1 0105	Certificate I in Engineering	MSAENV 272B (electives)	24 pts	24 pts	24 pts	8 pts	4 pts	Import allowance reverts to 5 points as in MEM05v2 (incorrectly changed to 7 points June 2010, based on wrong points calculations).
MEM1 0205	Certificate I in Boating Services	MSAENV 272B (electives)	3 units	3 units	10 units	3 units	2 units	Imports increased from nil

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								to 2 units.
MEM20105	Certificate II in Engineering	MSAENV 272B (electives)	30 pts	30 pts	32 pts	11 pts	5 pts	Import allowance reverts to 6 points as in MEM05v2 (incorrectly changed to 8 points June 2010, based on wrong points calculations)
MEM20205	Certificate II in Engineering – Production Technology	MSAENV 272B (core)	53 pts	50 pts	64 pts	21 pts	11 pts	Sustainability unit added to core and elective points adjusted. Import allowance reverts to 11 points (incorrectly changed to 14 points)

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								June 2010, based on wrong points calculations)
MEM20305	Certificate II in Boating Services	MSAENV 272B (electives)	6 units	6 units	14 units	5 units	2 units	Import allowance increased from one to two to meet 1/6 rule
MEM30105	Certificate III in Engineering – Production Systems	MSAENV 272B (core) MSAENV 472B (specialisation electives)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6 rule.
MEM30205	Certificate III in Engineering – Mechanical Trade	MSAENV 272B (core) MSAENV 472B (specialisation)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
		electives)						adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6 rule.
MEM3 0305	Certificate III in Engineering – Fabrication Trade	MSAENV 272B (core) MSAENV 472B (specialisation electives)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6 rule. Eight MEM 06 series units added to fabrication trade stream.
MEM3 0405	Certificate III in Engineering – Electrical/Ele	MSAENV 272B (core) MSAENV	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core.

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
	Electronic Trade	472B (specialisation electives)						Total elective points adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6 rule.
MEM3 0505	Certificate III in Engineering – Technical	MSAENV 272B (core)	8 units	7 units	10 units	3 units	2 units	Sustainability unit added to core. Elective choice reduced to 7 units. Import allowance increased from nil to two units to meet 1/6 rule.
MEM3 0605	Certificate III in Jewellery Manufacture	MSAENV 272B (core) MSAENV 472B (specialisation electives)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points adjusted to 73. Import

Code	Title	MSAENV unit/s	MEM0 5v2 elective points/units required	MEM0 5v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								allowance increased from 15 to 16 to meet 1/6 rule.
MEM3 0705	Certificate III in Marine Craft Construction	MSAENV 272B (core) MSAENV 472B (specialisation electives)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6 rule.
MEM3 0805	Certificate III in Locksmithing	MSAENV 272B (core) MSAENV 472B (specialisation electives)	76 pts	73 pts	96 pts	32 pts	16 pts	Sustainability unit added to core. Total elective points adjusted to 73. Import allowance increased from 15 to 16 to meet 1/6

Code	Title	MSAENV unit/s	MEM0 5v2 elective points/units required	MEM0 5v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								rule.
MEM3 0905	Certificate III in Boating Services	MSAENV 272B (core)	14 units	13 units	21 units	7 units	4 units	Sustainability unit added to core. Elective choice reduced to 13 units. Import allowance increased from 3 to 4 units to meet 1/6 rule.
MEM3 1010	Certificate III in Watch and Clock Service and Repair	MSAENV 272B (core) MSAENV 472B (specialisation electives)	n/a	73 pts	96 pts	32 pts	16 pts	New qualification. Includes sustainability units and meets 1/3 and 1/6 requirements.
MEM4 0105	Certificate IV in Engineering	MSAENV 272B (core) MSAENV 472B (specialisation electives)	112 pts	109 pts	132 pts	44 pts	22 pts	Sustainability unit added to core. Total elective points adjusted to 109.

Code	Title	MSAENV unit/s	MEM0 5v2 elective points/units required	MEM0 5v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								No change to import allowance.
MEM4 0205	Certificate IV in Boating Services	MSAENV 272B (core) MSAENV 472B (electives)	20 units	19 units	29 units	10 units	5 units	Sustainability unit added to core. Elective choice reduced to 19 units. Import allowance increased from 4 to 5 units to meet 1/6 rule.
MEM5 0105	Diploma of Engineering – Advanced Trade	MSAENV 272B (core) MSAENV 472B (electives)	120 pts*	117 pts	156 pts	52 pts	26 pts	Sustainability unit added to core. Elective choice adjusted to 117. Import allowance increased from 24 to 26 to meet 1/6 requirement.

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								<i>*Note: error in MEM05v2 packaging rules corrected from 136 to 120 points.</i>
MEM50205	Diploma of Engineering – Technical	MSAENV 272B (core) MSAENV 472B (electives)	16 units	15 units	20 units	7 units	3 units	Sustainability unit added to core. Elective choice reduced to 15 units. Import allowance = 3 units (no change from MEM05v2.2 version, June 2010)
MEM60105	Advanced Diploma of Engineering	MSAENV 272B (core) MSAENV 472B and 672B (electives)	24 units	23 units	30 units	10 units	5 units	Sustainability unit added to core. Elective choice reduced to 23.

Code	Title	MSAENV unit/s	MEM05v2 elective points/units required	MEM05v3 elective points/units required	*Total points or units	1/3 elective requirement	1/6 import requirement	Comments
								<p>Import allowance = 5 units (no change from MEM05v2.2 version, June 2010).</p> <p>Addition of 12 Competitive Manufacturing units to Elective Group B.</p>

MEM05v3 - new units

Unit code	Unit title	Points
MEM21001A	Replace watch batteries, capacitors and bands	2
MEM21002A	Perform watch movement exchange	2
MEM21003A	Perform watch case servicing, repair and refurbishment	4
MEM21004A	Clean watch and clock components	2
MEM21005A	Diagnose faults in quartz watches	2
MEM21006A	Service quartz watches	4

MEM21007A	Service complex quartz watches	4
MEM21008A	Service mechanical watches	4
MEM21009A	Inspect, diagnose, adjust and repair mechanical watches	4
MEM21010A	Service watch power generating systems	2
MEM21011A	Service calendar and other dial indication mechanisms for watches	4
MEM21012A	Service and repair mechanical watch oscillating systems	4
MEM21013A	Service, test and adjust watch escapements	4
MEM21014A	Service mechanical chronograph watches	6
MEM21015A	Perform precision watch timing and adjustment	6
MEM21016A	Install and set up clocks	2
MEM21017A	Service and repair clock timepieces	6
MEM21018A	Service clock escapements and oscillating systems	4
MEM21019A	Service and repair clock striking mechanisms	4
MEM21020A	Service and repair clock chiming mechanisms	6
MEM21021A	Restore clockwork mechanisms	6
MEM21022A	Manufacture watch and clock components	6
MEM21023A	Plan, set up and operate horological workshop or service centre	4

MEM05v2 Qualifications mapping V1.02 to V2

MEM05v1.02	MEM05v2	Qualification name	Comment
MEM40105	MEM40105	Certificate IV in Engineering	Addition of four metallurgy units to Specialisation Group 1 electives and one imported unit added to Specialisation Group 2

			electives.
MEM30205	MEM30205	Certificate III in Engineering-Mechanical	Expanded qualification descriptor - equivalent
MEM30305	MEM30305	Certificate III in Engineering-Fabrication	Expanded qualification descriptor - equivalent
MEM30405	MEM30405	Certificate III in Engineering-Electrical/Electronic Trade	Expanded qualification descriptor - equivalent
MEM40105	MEM40105	Certificate IV in Engineering	Expanded qualification descriptor - equivalent
MEM50105	MEM50105	Diploma of Engineering-Advanced Trade	Expanded qualification descriptor - equivalent

MEM05 Qualifications mapping V1.01 to V1.02

Following is a summary list of qualification codes for the MEM05 V1.02 Metal and Engineering Training Package. Qualifications have been mapped to show their relationship to the previous version MEM05 V1.01

V1.02	V1.01	Nature of relationship	Change to qualification outcome
MEM10105	MEM10105	Equivalent qualification	No change
MEM10205	MEM10205	Equivalent qualification	No change
MEM20105	MEM20105	Equivalent qualification	No change
MEM20205	MEM20205	Equivalent qualification	No change
MEM20305	MEM20305	Equivalent qualification	No change
MEM30105	MEM30105	Equivalent qualification	No change
MEM30205	MEM30205	Equivalent qualification	No change
MEM30305	MEM30305	Equivalent qualification	No change
MEM30405	MEM30405	Equivalent qualification	No change
MEM30505	MEM30505	Equivalent qualification	No change

MEM30605	MEM30605	Equivalent qualification	No change
MEM30705	MEM30705	Equivalent qualification	No change
MEM30805	MEM30805	Equivalent qualification	No change
MEM30905	MEM30905	Equivalent qualification	No change
MEM40105	MEM40105	Equivalent qualification	No change
MEM40205	MEM40205	Equivalent qualification	No change
MEM50105	MEM50105	Equivalent qualification	No change
MEM50205	MEM50205	Equivalent qualification	No change
MEM60105	MEM60105	Equivalent qualification	No change

Unit mapping MEM05 V2 to V1.02

The letter 'Y' in the prerequisite column (labeled P) of the mapping table below indicates that a unit of competency has one or more prerequisites. Refer to Appendix 1 for details of pre-requisite units.

MEM05v1.02	MEM05v2	Unit title	P	Comment
		Metallurgy		
	MEM04020A	Supervise individual ferrous melting and casting operation	Y	New unit
	MEM04021A	Supervise individual non ferrous melting and casting operation	Y	New unit
	MEM04022A	Examine appropriateness of methoding for mould design	Y	New unit
	MEM04023A	Undertake prescribed tests on foundry related materials	Y	New unit
MEM24012B	MEM24012C	Apply metallurgy principles		Minor edits to include reference to alloys. Equivalent.
		Critical trade		

MEM04005B	MEM04005C	Produce moulds and cores by hand (jobbing)	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05010B	MEM05010C	Apply fabrication, forming and shaping techniques	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05011C	MEM05011D	Assemble fabricated components	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05015C	MEM05015D	Weld using manual metal arc welding process	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05017C	MEM05017D	Weld using gas metal arc welding process	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05019C	MEM05019D	Weld using gas tungsten arc welding process	Y	Redefined and updated Evidence Guides. Equivalent.
MEM05026B	MEM05026C	Apply welding principles		Redefined and updated Evidence Guides. Equivalent.
MEM05037B	MEM05037C	Perform geometric development	Y	Redefined and updated Evidence Guides. Equivalent.
MEM07005B	MEM07005C	Perform general machining	Y	Redefined and updated Evidence Guides. Equivalent.
MEM07006B	MEM07006C	Perform lathe operations	Y	Redefined and updated Evidence Guides. Equivalent.
MEM07007B	MEM07007C	Perform milling operations	Y	Redefined and updated Evidence Guides. Equivalent.
MEM07008C	MEM07008D	Perform grinding operations	Y	Redefined and updated Evidence Guides. Equivalent.

MEM12006B	MEM12006C	Mark off/out (general engineering)	Y	Redefined and updated Evidence Guides. Equivalent.
MEM12007C	MEM12007D	Mark off/out structural fabrications and shapes	Y	Redefined and updated Evidence Guides. Equivalent.
MEM18006B	MEM18006C	Repair and fit engineering components	Y	Redefined and updated Evidence Guides. Equivalent.
		Circuit testing		
MEM18049B	MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	Y	Redefined skills and knowledge for circuit testing – equivalent
MEM18050B	MEM18050C	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.	Y	Redefined skills and knowledge for circuit testing – equivalent

Unit mapping MEM05 V1.01 to V1.02

The letter 'Y' in the prerequisite column (labeled P) of the mapping table below indicates that a unit of competency has one or more prerequisites. Refer to Appendix 1 for details of pre-requisite units.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM03001B	Perform manual production assembly		No change. Equivalent unit
MEM03002B	Perform precision assembly	Y	No change. Equivalent unit
MEM03003B	Perform sheet and plate assembly	Y	Corrected title of MEM05003B in pre req pathway. Cat 1 change. Unit equivalent.
MEM03004B	Perform electronic/electrical assembly (production)		No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM03005B	Rework and repair (electrical/electronic production)	Y	No change. Equivalent unit
MEM03006B	Set assembly stations	Y	No change. Equivalent unit
MEM04001B	Operate melting furnaces	Y	No change. Equivalent unit
MEM04002B	Perform gravity die casting	Y	No change. Equivalent unit
MEM04003B	Operate pressure die casting machine	Y	No change. Equivalent unit
MEM04004B	Prepare and mix sand for metal moulding		No change. Equivalent unit
MEM04005B	Produce moulds and cores by hand (jobbing)	Y	No change. Equivalent unit
MEM04006B	Operate sand moulding and core making machines		No change. Equivalent unit
MEM04007B	Pour molten metal	Y	No change. Equivalent unit
MEM04008B	Fettle and trim metal castings/forgings	Y	No change. Equivalent unit
MEM04010B	Develop and manufacture wood patterns	Y	No change. Equivalent unit
MEM04011B	Produce polymer patterns	Y	No change. Equivalent unit
MEM04012B	Assemble plated patterns	Y	No change. Equivalent unit
MEM04013B	Develop and manufacture polystyrene patterns	Y	No change. Equivalent unit
MEM04014B	Develop and manufacture production patterns	Y	No change. Equivalent unit
MEM04015B	Develop and manufacture vacuum	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	forming moulds and associated equipment		unit
MEM04016C	Develop and manufacture precision models	Y	No change. Equivalent unit
MEM04017B	Develop and manufacture gear, conveyor screw and propeller patterns	Y	No change. Equivalent unit
MEM04018B	Perform general woodworking machine operations	Y	No change. Equivalent unit
MEM04019B	Perform refractory installation and repair	Y	No change. Equivalent unit
MEM05001B	Perform manual soldering/desoldering – electrical/electronic components		No change. Equivalent unit
MEM05002B	Perform high reliability soldering and desoldering	Y	No change. Equivalent unit
MEM05003B	Perform soft soldering		No change. Equivalent unit
MEM05004C	Perform routine oxy acetylene welding		No change. Equivalent unit
MEM05005B	Carry out mechanical cutting	Y	No change. Equivalent unit
MEM05006B	Perform brazing and/or silver soldering		No change. Equivalent unit
MEM05007C	Perform manual heating and thermal cutting		Correction to unit title Correction to PC numbering Cat 1 change. Cat 1 change. Unit equivalent.
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping	Y	No change. Equivalent unit
MEM05009C	Perform automated thermal cutting	Y	No change. Equivalent unit
MEM05010B	Apply fabrication, forming and shaping	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	techniques		unit
MEM05011C	Assemble fabricated components	Y	No change. Equivalent unit
MEM05012C	Perform routine manual metal arc welding		No change. Equivalent unit
MEM05013C	Perform manual production welding		No change. Equivalent unit
MEM05014C	Monitor quality of production welding/fabrications	Y	No change. Equivalent unit
MEM05015C	Weld using manual metal arc welding process	Y	No change. Equivalent unit
MEM05016C	Perform advanced welding using manual metal arc welding process	Y	No change. Equivalent unit
MEM05017C	Weld using gas metal arc welding process	Y	No change. Equivalent unit
MEM05018C	Perform advanced welding using gas metal arc welding process	Y	Application and range statement clarified. Cat 1 change. Unit equivalent.
MEM05019C	Weld using gas tungsten arc welding process	Y	No change. Equivalent unit
MEM05020C	Perform advanced welding using gas tungsten arc welding process	Y	No change. Equivalent unit
MEM05022C	Perform advanced welding using oxy acetylene welding process	Y	No change. Equivalent unit
MEM05023C	Weld using submerged arc welding process	Y	Deleted incorrect references in knowledge list. Cat 1 change. Unit equivalent.
MEM05024B	Perform welding supervision	Y	No change. Equivalent unit
MEM05025C	Perform welding/fabrication inspection	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM05026B	Apply welding principles		No change. Equivalent unit
MEM05036C	Repair/replace/modify fabrications	Y	No change. Equivalent unit
MEM05037B	Perform geometric development	Y	No change. Equivalent unit
MEM05038B	Perform advanced geometric development - cylindrical/rectangular	Y	Application statement clarified. Cat 1 change. Unit equivalent.
MEM05039B	Perform advanced geometric development - conical	Y	Application statement clarified. Cat 1 change. Unit equivalent.
MEM05040B	Perform advanced geometric development - transitions	Y	Application statement clarified. Cat 1 change. Unit equivalent.
MEM05041B	Weld using powder flame spraying	Y	
MEM05042B	Perform welds to code standards using flux core arc welding process	Y	Corrected missing pre-requisite. Cat 1 change. Unit equivalent.
MEM05043B	Perform welds to code standards using gas metal arc welding process	Y	No change. Equivalent unit
MEM05044B	Perform welds to code standards using gas tungsten arc welding process	Y	No change. Equivalent unit
MEM05045B	Perform pipe welds to code standards using manual metal arc welding process	Y	No change. Equivalent unit
MEM05046B	Perform welds to code standards using manual metal arc welding process	Y	No change. Equivalent unit
MEM05047B	Weld using flux core arc welding process	Y	Corrected missing pre-requisite. Cat 1 change. Unit equivalent.
MEM05048B	Perform advanced welding using flux core arc welding process	Y	Corrected missing pre-requisite. Cat 1 change. Unit equivalent.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM05049B	Perform routine gas tungsten arc welding		No change. Equivalent unit
MEM05050B	Perform routine gas metal arc welding		No change. Equivalent unit
MEM05051A	Select welding processes		No change. Equivalent unit
MEM05052A	Apply safe welding practices		No change. Equivalent unit
MEM05053A	Set and edit computer controlled thermal cutting machines	Y	No change. Equivalent unit
MEM05054A	Write basic NC/CNC programs for thermal cutting machines	Y	No change. Equivalent unit
MEM06001B	Perform hand forging	Y	No change. Equivalent unit
MEM06002B	Perform hammer forging		No change. Equivalent unit
MEM06003C	Carry out heat treatment		No change. Equivalent unit
MEM06004B	Select heat treatment processes and test finished product	Y	No change. Equivalent unit
MEM06005B	Perform drop and upset forging	Y	No change. Equivalent unit
MEM06006C	Repair springs	Y	No change. Equivalent unit
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing		No change. Equivalent unit
MEM06008A	Hammer forge complex shapes	Y	No change. Equivalent unit
MEM06009A	Hand forge complex shapes	Y	No change. Equivalent unit
MEM07001B	Perform operational maintenance of	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	machines/equipment		unit
MEM07002B	Perform precision shaping/planing/slotting operations	Y	No change. Equivalent unit
MEM07003B	Perform machine setting (routine)	Y	No change. Equivalent unit
MEM07004B	Perform machine setting (complex)	Y	No change. Equivalent unit
MEM07005B	Perform general machining	Y	Application statement clarified. Cat 1 change. Unit equivalent.
MEM07006B	Perform lathe operations	Y	No change. Equivalent unit
MEM07007B	Perform milling operations	Y	No change. Equivalent unit
MEM07008C	Perform grinding operations	Y	No change. Equivalent unit
MEM07009B	Perform precision jig boring operations	Y	No change. Equivalent unit
MEM07010B	Perform tool and cutter grinding operations	Y	No change. Equivalent unit
MEM07011B	Perform complex milling operations	Y	No change. Equivalent unit
MEM07012B	Perform complex grinding operations	Y	No change. Equivalent unit
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines	Y	No change. Equivalent unit
MEM07014B	Perform electro-discharge machining operations (EDM)	Y	No change. Equivalent unit
MEM07015B	Set computer controlled machines/processes	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM07016C	Set and edit computer controlled machines/processes	Y	No change. Equivalent unit
MEM07018C	Write basic NC/CNC programs	Y	No change. Equivalent unit
MEM07019C	Program NC/CNC machining centre	Y	No change. Equivalent unit
MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre	Y	No change. Equivalent unit
MEM07021B	Perform complex lathe operations	Y	No change. Equivalent unit
MEM07022C	Program CNC wire cut machines	Y	No change. Equivalent unit
MEM07023C	Program and set up CNC manufacturing cell	Y	No change. Equivalent unit
MEM07024B	Operate and monitor machine/process		No change. Equivalent unit
MEM07025B	Perform advanced machine/process operation	Y	No change. Equivalent unit
MEM07026B	Perform advanced plastic processing	Y	No change. Equivalent unit
MEM07027B	Perform advanced press operations	Y	No change. Equivalent unit
MEM07028B	Operate computer controlled machines/processes	Y	No change. Equivalent unit
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters	Y	No change. Equivalent unit
MEM07030C	Perform metal spinning lathe operations (basic)	Y	No change. Equivalent unit
MEM07031C	Perform metal spinning lathe operations (complex)	Y	Corrected title of MEM05003B in pre req pathway. Cat 1 change. Unit equivalent.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM07032B	Use workshop machines for basic operations	Y	No change. Equivalent unit
MEM07033B	Operate and monitor basic boiler		No change. Equivalent unit
MEM07034A	Operate and monitor intermediate class boiler	Y	No change. Equivalent unit
MEM07039A	Write programs for industrial robots	Y	No change. Equivalent unit
MEM07040A	Set multistage integrated processes	Y	No change. Equivalent unit
MEM08001B	Perform wire, jig and barrel load/unload work		No change. Equivalent unit
MEM08002C	Pre-treat work for subsequent surface coating	Y	No change. Equivalent unit
MEM08003C	Perform electroplating operations	Y	No change. Equivalent unit
MEM08004B	Finish work using wet, dry and vapour deposition methods	Y	No change. Equivalent unit
MEM08005B	Prepare and produce specialised coatings	Y	No change. Equivalent unit
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	Y	No change. Equivalent unit
MEM08007B	Control surface finish production and finished product quality		No change. Equivalent unit
No change. Equivalent unit MEM08008B	Operate and control surface finishing waste treatment process	Y	No change. Equivalent unit
MEM08009C	Make up solutions	Y	No change. Equivalent unit
MEM08010B	Manually finish/polish materials	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM08011B	Prepare surfaces using solvents and/or mechanical means	Y	No change. Equivalent unit
MEM08012B	Prepare surfaces by abrasive blasting (basic)	Y	No change. Equivalent unit
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	Y	No change. Equivalent unit
MEM08014B	Apply protective coatings (basic)	Y	No change. Equivalent unit
MEM08015B	Apply protective coatings (advanced)	Y	No change. Equivalent unit
MEM08016B	Control blast coating by-products, materials and emissions	Y	No change. Equivalent unit
MEM08018B	Electroplate engineering coatings	Y	No change. Equivalent unit
MEM08019B	Electroplate protective finishes	Y	No change. Equivalent unit
MEM08020B	Electroplate decorative finishes	Y	No change. Equivalent unit
MEM09002B	Interpret technical drawing		No change. Equivalent unit
MEM09003B	Prepare basic engineering drawing	Y	No change. Equivalent unit
MEM09004B	Perform electrical/electronic detail drafting	Y	No change. Equivalent unit
MEM09005B	Perform basic engineering detail drafting	Y	No change. Equivalent unit
MEM09006B	Perform advanced engineering detail drafting	Y	No change. Equivalent unit
MEM09007B	Perform advanced mechanical detail drafting	Y	No change. Equivalent unit
MEM09008B	Perform advanced structural detail	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	drafting		unit
MEM09009C	Create 2D drawings using computer aided design system	Y	No change. Equivalent unit
MEM09010C	Create 3D models using computer aided design system	Y	No change. Equivalent unit
MEM09011B	Apply basic engineering design concepts	Y	No change. Equivalent unit
MEM09021B	Interpret and produce curved 3-dimensional shapes		No change. Equivalent unit
MEM09022A	Create 2D code file using computer aided manufacturing system	Y	Correction to unit title Cat 1 change. Unit equivalent.
MEM09023A	Create 3D code files using computer aided manufacturing system	Y	Correction to MEM09022 unit title in pre-req pathway. Cat 1 change. Unit equivalent.
MEM09141A	Represent mechanical engineering designs	Y	No change. Equivalent unit
MEM09142A	Represent mechatronic engineering designs	Y	No change. Equivalent unit
MEM09151A	Apply computer aided modelling and data management techniques to mechanical engineering designs	Y	No change. Equivalent unit
MEM09152A	Apply computer aided modelling and data management techniques to mechatronic engineering designs	Y	No change. Equivalent unit
MEM10001C	Erect structures	Y	No change. Equivalent unit
MEM10002B	Terminate and connect electrical wiring	Y	No change. Equivalent unit
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM10004B	Enter and change programmable controller operational parameters	Y	No change. Equivalent unit
MEM10005B	Commission programmable controller programs	Y	No change. Equivalent unit
MEM10006B	Install machine/plant	Y	No change. Equivalent unit
MEM10007C	Modify control systems	Y	No change. Equivalent unit
MEM10008B	Undertake commissioning procedures for plant and/or equipment	Y	No change. Equivalent unit
MEM10009B	Install refrigeration and air conditioning plant and equipment	Y	No change. Equivalent unit
MEM10010B	Install pipework and pipework assemblies	Y	No change. Equivalent unit
MEM10011B	Terminate and connect specialist cables	Y	No change. Equivalent unit
MEM10012A	Install split air conditioning system	Y	Deleted unit.
MEM10013A	Install split air conditioning systems and associated pipework	Y	New unit. Replaces and is not equivalent to MEM10012A
MEM11001C	Erect/dismantle scaffolding and equipment	Y	No change. Equivalent unit
MEM11002C	Erect/dismantle complex scaffolding and equipment	Y	No change. Equivalent unit
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	Y	No change. Equivalent unit
MEM11004B	Undertake dogging	Y	No change. Equivalent unit
MEM11005B	Pick and process order		No change. Equivalent unit
MEM11006B	Perform production packaging		No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
			unit
MEM11007B	Administer inventory procedures		No change. Equivalent unit
MEM11008B	Package materials (stores and warehouse)		No change. Equivalent unit
MEM11009B	Handle/move bulk fluids/gases		No change. Equivalent unit
MEM11010B	Operate mobile load shifting equipment		No change. Equivalent unit
MEM11011B	Undertake manual handling		No change. Equivalent unit
MEM11012B	Purchase materials		No change. Equivalent unit
MEM11013B	Undertake warehouse receival process	Y	No change. Equivalent unit
MEM11014B	Undertake warehouse dispatch process	Y	No change. Equivalent unit
MEM11015B	Manage warehouse inventory system	Y	No change. Equivalent unit
MEM11016B	Order materials		No change. Equivalent unit
MEM11017B	Organise and lead stocktakes	Y	No change. Equivalent unit
MEM11018B	Organise and maintain warehouse stock receival and/or dispatch system	Y	No change. Equivalent unit
MEM11019B	Undertake tool store procedures	Y	No change. Equivalent unit
MEM11020B	Perform advanced warehouse computer operations	Y	No change. Equivalent unit
MEM11021B	Perform advanced operation of load shifting equipment	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM11022B	Operate fixed/moveable load shifting equipment		No change. Equivalent unit
MEM12001B	Use comparison and basic measuring devices		No change. Equivalent unit
MEM12002B	Perform electrical/electronic measurement		No change. Equivalent unit
MEM12003B	Perform precision mechanical measurement	Y	No change. Equivalent unit
MEM12004B	Perform precision electrical/electronic measurement		No change. Equivalent unit
MEM12005B	Calibrate measuring equipment	Y	No change. Equivalent unit
MEM12006B	Mark off/out (general engineering)	Y	No change. Equivalent unit
MEM12007C	Mark off/out structural fabrications and shapes	Y	No change. Equivalent unit
MEM12019B	Measure components using coordinate measuring machines		Minor correction to unit title and descriptor. Cat 1 change. Unit equivalent.
MEM12020B	Set and operate coordinate measuring machines		Minor correction to unit title and descriptor. Cat 1 change. Unit equivalent.
MEM12021B	Program coordinate measuring machines	Y	Minor correction to unit title and descriptor. Cat 1 change. Unit equivalent.
MEM12022B	Program coordinate measuring machines (advanced)	Y	Minor correction to unit title and descriptor. Cat 1 change. Unit equivalent.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM12023A	Perform engineering measurements		No change. Equivalent unit
MEM12024A	Perform computations		No change. Equivalent unit
MEM12025A	Use graphical techniques and perform simple statistical computations	Y	No change. Equivalent unit
MEM13001B	Perform emergency first aid		No change. Equivalent unit
MEM13002B	Undertake occupational health and safety activities in the workplace		No change. Equivalent unit
MEM13003B	Work safely with industrial chemicals and materials		No change. Equivalent unit
MEM13004B	Work safely with molten metals/glass		No change. Equivalent unit
MEM13006B	Collect and evaluate occupational health and safety data for an enterprise or section of an enterprise		No change. Equivalent unit
MEM13007B	Maintain water treatment systems for cooling towers	Y	No change. Equivalent unit
MEM13010A	Supervise occupational health and safety in an industrial work environment.	Y	No change. Equivalent unit
MEM13013B	Work safely with ionizing radiation		No change. Equivalent unit
MEM13014A	Apply principles of occupational health and safety in the work environment		No change. Equivalent unit
MEM14001B	Schedule material deliveries		No change. Equivalent unit
MEM14002B	Undertake basic process planning		No change. Equivalent unit
MEM14003B	Undertake basic production scheduling		No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM14004A	Plan to undertake a routine task		No change. Equivalent unit
MEM14005A	Plan a complete activity		No change. Equivalent unit
MEM14061A	Plan and design mechanical engineering projects	Y	No change. Equivalent unit
MEM14062A	Plan and design mechatronic engineering projects	Y	No change. Equivalent unit
MEM14063A	Plan and design manufacturing engineering projects	Y	No change. Equivalent unit
MEM14064A	Plan and design maintenance engineering projects	Y	No change. Equivalent unit
MEM14081A	Apply mechanical engineering fundamentals to support design and development of projects	Y	No change. Equivalent unit
MEM14082A	Apply mechatronics fundamentals to support design and development of engineering projects	Y	No change. Equivalent unit
MEM15001B	Perform basic statistical quality control		No change. Equivalent unit
MEM15002A	Apply quality systems		No change. Equivalent unit
MEM15003B	Use improvement processes in team activities	Y	No change. Equivalent unit
MEM15004B	Perform inspection		No change. Equivalent unit
MEM15005B	Select and control inspection processes and procedures	Y	No change. Equivalent unit
MEM15007B	Conduct product and/or process capability studies	Y	No change. Equivalent unit
MEM15008B	Perform advanced statistical quality control	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM15010B	Perform laboratory procedures		No change. Equivalent unit
MEM15011B	Exercise external quality assurance	Y	No change. Equivalent unit
MEM15012B	Maintain/supervise the application of quality procedures	Y	No change. Equivalent unit
MEM15015B	Examine trading practices	Y	No change. Equivalent unit
MEM15016B	Inspect pre-packed articles	Y	No change. Equivalent unit
MEM15017B	Use and maintain reference standards	Y	No change. Equivalent unit
MEM15018B	Investigate consumer complaints	Y	No change. Equivalent unit
MEM15019B	Conduct a field inspection	Y	No change. Equivalent unit
MEM15020C	Perform verification/certification or in-service inspection	Y	No change. Equivalent unit
MEM15021C	Conduct audits of servicing licensees and public weighbridge licensees	Y	No change. Equivalent unit
MEM15022B	Verify reference standards	Y	No change. Equivalent unit
MEM15024A	Apply quality procedures		No change. Equivalent unit
MEM16001B	Give formal presentations and take part in meetings		No change. Equivalent unit
MEM16002C	Conduct formal interviews and negotiations		No change. Equivalent unit
MEM16003B	Provide advanced customer service		Correction to PC numbering. Cat 1 change. Unit equivalent.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM16004B	Perform internal/external customer service		No change. Equivalent unit
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities		No change. Equivalent unit
MEM16006A	Organise and communicate information		No change. Equivalent unit
MEM16007A	Work with others in a manufacturing, engineering or related environment		No change. Equivalent unit
MEM16008A	Interact with computing technology		No change. Equivalent unit
MEM16009A	Research and analyse engineering information	Y	No change. Equivalent unit
MEM16010A	Write reports	Y	No change. Equivalent unit
MEM16011A	Communicate with individuals and small groups	Y	No change. Equivalent unit
MEM16012A	Interpret technical specifications and manuals		No change. Equivalent unit
MEM16013A	Operate in a self-directed team	Y	No change. Equivalent unit
MEM16014A	Report technical information	Y	No change. Equivalent unit
MEM17001B	Assist in development and deliver training in the workplace		No change. Equivalent unit
MEM17002B	Conduct workplace assessment		No change. Equivalent unit
MEM17003A	Assist in the provision of on the job training		No change. Equivalent unit
MEM18001C	Use hand tools		No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM18002B	Use power tools/hand held operations		No change. Equivalent unit
MEM18003C	Use tools for precision work	Y	No change. Equivalent unit
MEM18004B	Maintain and overhaul mechanical equipment	Y	Correction to PC numbering. Cat 1 change. Unit equivalent.
MEM18005B	Perform fault diagnosis, installation and removal of bearings	Y	No change. Equivalent unit
MEM18006B	Repair and fit engineering components	Y	No change. Equivalent unit
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	Y	No change. Equivalent unit
MEM18008B	Balance equipment	Y	No change. Equivalent unit
MEM18009B	Perform levelling and alignment of machines and engineering components	Y	No change. Equivalent unit
MEM18010C	Perform equipment condition monitoring and recording	Y	No change. Equivalent unit
MEM18011C	Shut down and isolate machines/equipment		No change. Equivalent unit
MEM18012B	Perform installation and removal of mechanical seals	Y	No change. Equivalent unit
MEM18013B	Perform gland packing	Y	No change. Equivalent unit
MEM18014B	Manufacture press tools and gauges	Y	No change. Equivalent unit
MEM18015B	Maintain tools and dies	Y	No change. Equivalent unit
MEM18016B	Analyse plant and equipment condition monitoring results	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM18017C	Modify mechanical systems and equipment	Y	No change. Equivalent unit
MEM18018C	Maintain pneumatic system components	Y	No change. Equivalent unit
MEM18019B	Maintain pneumatic systems	Y	No change. Equivalent unit
MEM18020B	Maintain hydraulic system components	Y	No change. Equivalent unit
MEM18021B	Maintain hydraulic systems	Y	No change. Equivalent unit
MEM18022B	Maintain fluid power controls	Y	No change. Equivalent unit
MEM18023B	Modify fluid power system operation	Y	No change. Equivalent unit
MEM18024B	Maintain engine cooling systems	Y	No change. Equivalent unit
MEM18025B	Service combustion engines	Y	No change. Equivalent unit
MEM18026C	Test compression ignition fuel systems	Y	No change. Equivalent unit
MEM18027C	Overhaul engine fuel system components	Y	No change. Equivalent unit
MEM18028B	Maintain engine lubrication systems	Y	No change. Equivalent unit
MEM18029B	Tune diesel engines	Y	No change. Equivalent unit
MEM18030B	Diagnose and rectify low voltage electrical systems	Y	No change. Equivalent unit
MEM18031B	Diagnose and rectify low voltage starting systems	Y	No change. Equivalent unit
MEM18032B	Maintain induction/exhaust systems	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
			unit
MEM18033B	Perform engine bottom-end overhaul	Y	No change. Equivalent unit
MEM18034B	Perform engine top-end overhaul	Y	No change. Equivalent unit
MEM18035B	Diagnose and rectify braking systems	Y	No change. Equivalent unit
MEM18037B	Diagnose and rectify low voltage charging systems	Y	No change. Equivalent unit
MEM18038B	Maintain wheels and tyres	Y	No change. Equivalent unit
MEM18039B	Diagnose and rectify track type undercarriage	Y	No change. Equivalent unit
MEM18040B	Maintain suspension systems	Y	No change. Equivalent unit
MEM18041B	Maintain steering systems	Y	No change. Equivalent unit
MEM18042C	Diagnose and rectify manual transmissions	Y	No change. Equivalent unit
MEM18043C	Diagnose and rectify automatic transmissions	Y	No change. Equivalent unit
MEM18044C	Diagnose and rectify drive line and final drives	Y	No change. Equivalent unit
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	Y	No change. Equivalent unit
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	Y	No change. Equivalent unit
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM18048B	Fault find and repair/rectify basic electrical circuits	Y	No change. Equivalent unit
MEM18049B	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	Y	No change. Equivalent unit
MEM18050B	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.	Y	Minor title correction. Cat 1 change. Unit equivalent.
MEM18051B	Fault find and repair/rectify complex electrical circuits	Y	No change. Equivalent unit
MEM18052B	Maintain fluid power systems for mobile plant	Y	No change. Equivalent unit
MEM18053B	Modify fluid power control systems	Y	No change. Equivalent unit
MEM18054B	Fault find, test and calibrate instrumentation systems and equipment	Y	No change. Equivalent unit
MEM18055B	Dismantle, replace and assemble engineering components	Y	No change. Equivalent unit
MEM18056B	Diagnose and repair analog equipment and components	Y	No change. Equivalent unit
MEM18057B	Maintain/service analog/digital electronic equipment	Y	No change. Equivalent unit
MEM18058C	Modify electronic equipment	Y	No change. Equivalent unit
MEM18059B	Modify electronic systems	Y	No change. Equivalent unit
MEM18060B	Maintain, repair control instrumentation - single and multiple loop control systems	Y	No change. Equivalent unit
MEM18061B	Maintain/calibrate complex control systems	Y	No change. Equivalent unit
MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	final control elements		
MEM18063B	Terminate signal and data cables	Y	No change. Equivalent unit
MEM18064B	Maintain instrumentation system components	Y	No change. Equivalent unit
MEM18065B	Diagnose and repair digital equipment and components	Y	No change. Equivalent unit
MEM18066B	Diagnose and repair microprocessor-based equipment	Y	No change. Equivalent unit
MEM18067B	Tune control loops - multi controller or multi element systems	Y	No change. Equivalent unit
MEM18069B	Maintain, repair instrumentation process control analysers	Y	No change. Equivalent unit
MEM18070C	Modify complex electrical circuits and systems	Y	No change. Equivalent unit
MEM18071B	Connect/disconnect fluid conveying system components	Y	No change. Equivalent unit
MEM18072B	Manufacture fluid conveying conductor assemblies	Y	No change. Equivalent unit
MEM18073A	Perform advanced equipment testing and diagnostics on mobile plant and equipment	Y	No change. Equivalent unit
MEM18084A	Commission and decommission split air conditioning systems	Y	New unit. No equivalent.
MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances	Y	New unit. No equivalent.
MEM18086B	Test, recover, evacuate and charge refrigeration systems	Y	No change. Equivalent unit
MEM18087B	Service and repair domestic and light commercial refrigeration and air conditioning equipment	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM18088B	Maintain and repair commercial air conditioning systems and components	Y	No change. Equivalent unit
MEM18089B	Maintain and repair central air handling systems	Y	No change. Equivalent unit
MEM18090B	Maintain and repair industrial refrigeration systems and components	Y	No change. Equivalent unit
MEM18091B	Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems	Y	No change. Equivalent unit
MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls	Y	No change. Equivalent unit
MEM18093B	Maintain and repair integrated industrial refrigeration and/or large air handling system controls	Y	No change. Equivalent unit
MEM18094B	Service and repair commercial refrigeration	Y	No change. Equivalent unit
MEM18095A	Maintain and repair cooling towers/evaporative condensers and associated equipment	Y	No change. Equivalent unit
MEM18096A	Maintain, repair/replace and adjust refrigerant flow controls and associated equipment	Y	No change. Equivalent unit
MEM18097A	Manufacture cavity dies	Y	No change. Equivalent unit
MEM19001B	Perform jewellery metal casting	Y	No change. Equivalent unit
MEM19002B	Prepare jewellery illustrations	Y	No change. Equivalent unit
MEM19003B	Handle gem materials		No change. Equivalent unit
MEM19004B	Handle and examine gemstone materials	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM19005B	Produce three-dimensional precision items	Y	No change. Equivalent unit
MEM19006B	Replace watch batteries	Y	No change. Equivalent unit
MEM19007B	Perform gemstone setting	Y	No change. Equivalent unit
MEM19008B	Prepare jewellery designs	Y	No change. Equivalent unit
MEM19009B	Perform investment procedures for lost wax casting process	Y	No change. Equivalent unit
MEM19010B	Produce rubber moulds for lost wax casting process		No change. Equivalent unit
MEM19011B	Perform wax injection of moulds for lost wax casting process		No change. Equivalent unit
MEM19012B	Produce jewellery wax model	Y	No change. Equivalent unit
MEM19013B	Produce jewellery metal masters	Y	No change. Equivalent unit
MEM19014B	Perform hand engraving	Y	No change. Equivalent unit
MEM19015B	Perform jewellery enamelling	Y	No change. Equivalent unit
MEM19016B	Construct jewellery components	Y	No change. Equivalent unit
MEM19017B	Fabricate jewellery items	Y	No change. Equivalent unit
MEM19018B	Repair jewellery items	Y	No change. Equivalent unit
MEM19020B	Fault-find and maintain micro-mechanisms	Y	No change. Equivalent unit
MEM19021B	Diagnose and service micro-mechanisms	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
			unit
MEM19022B	Perform precision micro-mechanism diagnosis and servicing	Y	No change. Equivalent unit
MEM20001A	Produce keys		No change. Equivalent unit
MEM20002A	Assemble and test lock mechanisms	Y	No change. Equivalent unit
MEM20003A	Install and upgrade locks and hardware	Y	No change. Equivalent unit
MEM20004A	Gain entry	Y	No change. Equivalent unit
MEM20005A	Install and maintain door control devices/systems	Y	No change. Equivalent unit
MEM20006A	Maintain and service mechanical locking devices	Y	No change. Equivalent unit
MEM20007A	Plan and prepare a masterkey system	Y	Pre-requisite correction. Cat 1 change. Unit equivalent.
MEM20008A	Develop and implement a masterkey system	Y	Pre-requisite correction. Cat 1 change. Unit equivalent.
MEM20009A	Gain entry and reinstate fire and security containers	Y	No change. Equivalent unit
MEM20010A	Gain entry and reinstate automotive locking systems	Y	No change. Equivalent unit
MEM20011A	Service and repair fire and security containers	Y	No change. Equivalent unit
MEM20012A	Service and repair mechanical automotive locking systems	Y	No change. Equivalent unit
MEM20013A	Service automotive transponder systems	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM20014A	Perform a site security survey		No change. Equivalent unit
MEM22001A	Perform engineering activities	Y	No change. Equivalent unit
MEM22002A	Manage self in the engineering environment	Y	No change. Equivalent unit
MEM22003A	Manage engineering resources	Y	No change. Equivalent unit
MEM22004A	Manage engineering projects	Y	No change. Equivalent unit
MEM22005A	Manage engineering operations	Y	No change. Equivalent unit
MEM22006A	Source and estimate materials	Y	No change. Equivalent unit
MEM22007A	Manage environmental effects of engineering activities	Y	No change. Equivalent unit
MEM22008A	Manage change and technical development	Y	No change. Equivalent unit
MEM22009A	Manage technical sales and promotion	Y	No change. Equivalent unit
MEM23001A	Apply advanced mathematical techniques in a manufacturing engineering or related environment	Y	No change. Equivalent unit
MEM23002A	Apply calculus in engineering situations	Y	No change. Equivalent unit
MEM23003A	Operate and program computers and/or controllers in engineering situations	Y	No change. Equivalent unit
MEM23041A	Apply basic scientific principles and techniques in mechanical engineering situations		No change. Equivalent unit
MEM23051A	Apply basic electro and control scientific principles and techniques in mechanical		No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	and manufacturing engineering situations		
MEM23061A	Select and test mechanical engineering materials		Updated reference to National Measurement Institute. Cat 1 change. Unit equivalent.
MEM23062A	Select and test mechatronic engineering materials		Updated reference to National Measurement Institute. Cat 1 change. Unit equivalent.
MEM23071A	Select and apply mechanical engineering methods, processes and construction techniques		No change. Equivalent unit
MEM23072A	Select and apply mechatronic engineering methods, processes and construction techniques		No change. Equivalent unit
MEM23081A	Apply scientific principles and techniques in mechanical engineering situations	Y	No change. Equivalent unit
MEM23082A	Apply scientific principles and techniques in mechatronic engineering situations	Y	No change. Equivalent unit
MEM23083A	Apply industrial engineering principles and techniques in competitive manufacturing engineering situations	Y	No change. Equivalent unit
MEM23091A	Apply mechanical system design principles and techniques in mechanical engineering situations	Y	No change. Equivalent unit
MEM23092A	Apply automated systems principles and techniques in engineering situations	Y	Corrected "automotive" to "automated" Cat 1 change. Unit equivalent.
MEM23093A	Apply plant and process design principles and techniques in engineering situations	Y	Corrected reference to "no" prerequisites. Cat 1 change. Unit equivalent.
MEM23094A	Apply maintenance systems principles and techniques in engineering situations	Y	No change. Equivalent unit
MEM24001B	Perform basic penetrant testing	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
			unit
MEM24002B	Perform penetrant testing	Y	No change. Equivalent unit
MEM24003B	Perform basic magnetic particle testing	Y	No change. Equivalent unit
MEM24004B	Perform magnetic particle testing	Y	No change. Equivalent unit
MEM24005B	Perform basic eddy current testing	Y	No change. Equivalent unit
MEM24006B	Perform eddy current testing	Y	No change. Equivalent unit
MEM24007B	Perform ultrasonic thickness testing	Y	No change. Equivalent unit
MEM24008B	Perform ultrasonic testing	Y	No change. Equivalent unit
MEM24009B	Perform basic radiographic testing	Y	No change. Equivalent unit
MEM24010B	Perform radiographic testing	Y	No change. Equivalent unit
MEM24011B	Establish non-destructive tests	Y	No change. Equivalent unit
MEM24012B	Apply metallurgy principles		No change. Equivalent unit
MEM25001B	Apply fibre-reinforced materials	Y	No change. Equivalent unit
MEM25002B	Form and integrate fibre-reinforced structures	Y	No change. Equivalent unit
MEM25003B	Set up marine vessel structures	Y	No change. Equivalent unit
MEM25004B	Fair and shape surfaces	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM25005B	Construct and assemble marine vessel timber components	Y	No change. Equivalent unit
MEM25006B	Undertake marine sheathing operations	Y	No change. Equivalent unit
MEM25007B	Maintain marine vessel surfaces	Y	No change. Equivalent unit
MEM25008B	Repair marine vessel surfaces and structures	Y	No change. Equivalent unit
MEM25009B	Form timber shapes using hot processes	Y	No change. Equivalent unit
MEM25010B	Perform fitout procedures	Y	No change. Equivalent unit
MEM25011B	Install marine systems	Y	No change. Equivalent unit
MEM25012B	Install and test operations of marine auxiliary systems	Y	No change. Equivalent unit
MEM25013B	Produce three-dimensional plugs/moulds	Y	No change. Equivalent unit
MEM25014B	Perform marine slipping operations	Y	No change. Equivalent unit
MEM25015A	Assemble and install equipment and accessories/ancillaries		No change. Equivalent unit
MEM30001A	Use computer aided drafting systems to produce basic engineering drawings	Y	No change. Equivalent unit
MEM30002A	Produce basic engineering graphics	Y	No change. Equivalent unit
MEM30003A	Produce detailed engineering drawings	Y	No change. Equivalent unit
MEM30004A	Use CAD to create and display 3D models	Y	Corrected pre-requisite. Cat 1 change. Unit equivalent.

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM30005A	Calculate force systems within simple beam structures	Y	No change. Equivalent unit
MEM30006A	Calculate stresses in simple structures	Y	No change. Equivalent unit
MEM30007A	Select common engineering materials		No change. Equivalent unit
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications		No change. Equivalent unit
MEM30009A	Contribute to the design of basic mechanical systems	Y	No change. Equivalent unit
MEM30010A	Set up basic hydraulic circuits		No change. Equivalent unit
MEM30011A	Set up basic pneumatic circuits		No change. Equivalent unit
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment		No change. Equivalent unit
MEM30013A	Assist in the preparation of a basic workplace layout		No change. Equivalent unit
MEM30014A	Apply basic just in time systems to the reduction of waste		No change. Equivalent unit
MEM30015A	Develop recommendations for basic set up time improvements		No change. Equivalent unit
MEM30016A	Assist in the analysis of a supply chain		No change. Equivalent unit
MEM30017A	Use basic preventative maintenance techniques and tools		No change. Equivalent unit
MEM30018A	Undertake basic process planning		No change. Equivalent unit
MEM30019A	Use resource planning software systems in manufacturing	Y	No change. Equivalent unit

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
MEM30020A	Develop and manage a plan for a simple manufacturing related project		No change. Equivalent unit
MEM30021A	Prepare a simple production schedule		No change. Equivalent unit
MEM30022A	Undertake supervised procurement activities		No change. Equivalent unit
MEM30023A	Prepare a simple cost estimate for a manufactured product		No change. Equivalent unit
MEM30024A	Participate in quality assurance techniques	Y	No change. Equivalent unit
MEM30025A	Analyse a simple electrical system circuit	Y	No change. Equivalent unit
MEM30026A	Select and test components for simple electronic switching and timing circuits	Y	No change. Equivalent unit
MEM30027A	Prepare basic programs for programmable logic controllers		No change. Equivalent unit
MEM30028A	Assist in sales of technical products/systems		No change. Equivalent unit
MEM50001B	Classify recreational boating technologies and features		No change. Equivalent unit
MEM50002B	Work safely on marine craft		No change. Equivalent unit
MEM50003B	Follow work procedures to maintain the marine environment		No change. Equivalent unit
MEM50004B	Maintain quality of environment by following marina codes	Y	No change. Equivalent unit
MEM50005B	Refuel vessels	Y	No change. Equivalent unit
MEM50006B	Check operational capability of marine craft	Y	No change. Equivalent unit
MEM50007B	Check operational capability of sails and	Y	No change. Equivalent

MEM05 Unit code	MEM05 Unit title	P	Relationship to previous training package version
	sail operating equipment		unit
MEM50008B	Carry out trip preparation and planning		No change. Equivalent unit
MEM50009B	Safely operate a mechanically powered recreational boat		No change. Equivalent unit
MEM50010B	Respond to boating emergencies and incidents		No change. Equivalent unit

Explanation of the review date

The review date (shown on the title page and in the header of each 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. Endorsed Training Packages and their components remain current until they are reviewed or replaced.

Summary of AQF Qualifications in this Package

AQF Qualifications in MEM05v9

MEM10105	Certificate I in Engineering
MEM10205	Certificate I in Boating Services
MEM20105	Certificate II in Engineering
MEM20205	Certificate II in Engineering - Production Technology
MEM20305	Certificate II in Boating Services
MEM30105	Certificate III in Engineering - Production Systems
MEM30205	Certificate III in Engineering - Mechanical Trade
MEM30305	Certificate III in Engineering - Fabrication Trade
MEM30405	Certificate III in Engineering - Electrical/Electronic Trade
MEM30505	Certificate III in Engineering - Technical
MEM30605	Certificate III in Jewellery Manufacture

AQF Qualifications in MEM05v9

MEM10105	Certificate I in Engineering
MEM10205	Certificate I in Boating Services
MEM30705	Certificate III in Marine Craft Construction
MEM30805	Certificate III in Locksmithing
MEM30905	Certificate III in Boating Services
MEM31010	Certificate III in Watch and Clock Service and Repair
MEM31112	Certificate III in Engineering (Composites Trade)
MEM40105	Certificate IV in Engineering
MEM40205	Certificate IV in Boating Services
MEM40311	Certificate IV in Advanced Jewellery Manufacture
MEM40412	Certificate IV in Engineering Drafting
MEM50105	Diploma of Engineering - Advanced Trade
MEM50212	Diploma of Engineering - Technical
MEM50311	Diploma of Jewellery and Object Design
MEM60112	Advanced Diploma of Engineering
MEM60211	Advanced Diploma of Jewellery and Object Design
MEM80112	Vocational Graduate Diploma of Engineering

List of MEM05v9 Units within Training Package

Unit code	Unit title
MEM03001B	Perform manual production assembly
MEM03002B	Perform precision assembly

Unit code	Unit title
MEM03003B	Perform sheet and plate assembly
MEM03004B	Perform electronic/electrical assembly (production)
MEM03005B	Rework and repair (electrical/electronic production)
MEM03006B	Set assembly stations
MEM04001B	Operate melting furnaces
MEM04002B	Perform gravity die casting
MEM04003B	Operate pressure die casting machine
MEM04004B	Prepare and mix sand for metal moulding
MEM04005C	Produce moulds and cores by hand (jobbing)
MEM04006B	Operate sand moulding and core making machines
MEM04007B	Pour molten metal
MEM04008B	Fettle and trim metal castings/forgings
MEM04010B	Develop and manufacture wood patterns
MEM04011B	Produce polymer patterns
MEM04012B	Assemble plated patterns
MEM04013B	Develop and manufacture polystyrene patterns
MEM04014B	Develop and manufacture production patterns
MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment
MEM04016C	Develop and manufacture precision models
MEM04017B	Develop and manufacture gear, conveyor screw and propeller patterns
MEM04018B	Perform general woodworking machine operations
MEM04019B	Perform refractory installation and repair
MEM04020A	Supervise individual ferrous melting and casting operation

Unit code	Unit title
MEM04021A	Supervise individual non ferrous melting and casting operation
MEM04022A	Examine appropriateness of methoding for mould design
MEM04023A	Undertake prescribed tests on foundry related materials
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components
MEM05002B	Perform high reliability soldering and desoldering
MEM05003B	Perform soft soldering
MEM05004C	Perform routine oxy acetylene welding
MEM05005B	Carry out mechanical cutting
MEM05006C	Perform brazing and/or silver soldering
MEM05007C	Perform manual heating and thermal cutting
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping
MEM05009C	Perform automated thermal cutting
MEM05010C	Apply fabrication, forming and shaping techniques
MEM05011D	Assemble fabricated components
MEM05012C	Perform routine manual metal arc welding
MEM05013C	Perform manual production welding
MEM05014C	Monitor quality of production welding/fabrications
MEM05015D	Weld using manual metal arc welding process
MEM05016C	Perform advanced welding using manual metal arc welding process
MEM05017D	Weld using gas metal arc welding process
MEM05018C	Perform advanced welding using gas metal arc welding process
MEM05019D	Weld using gas tungsten arc welding process
MEM05020C	Perform advanced welding using gas tungsten arc welding process
MEM05022C	Perform advanced welding using oxy acetylene welding process

Unit code	Unit title
MEM05023C	Weld using submerged arc welding process
MEM05024B	Perform welding supervision
MEM05025C	Perform welding/fabrication inspection
MEM05026C	Apply welding principles
MEM05027A	Perform aluminothermic welding
MEM05036C	Repair/replace/modify fabrications
MEM05037C	Perform geometric development
MEM05038B	Perform advanced geometric development - cylindrical/rectangular
MEM05039B	Perform advanced geometric development - conical
MEM05040B	Perform advanced geometric development - transitions
MEM05041B	Weld using powder flame spraying
MEM05042B	Perform welds to code standards using flux core arc welding process
MEM05043B	Perform welds to code standards using gas metal arc welding process
MEM05044B	Perform welds to code standards using gas tungsten arc welding process
MEM05045B	Perform pipe welds to code standards using manual metal arc welding process
MEM05046B	Perform welds to code standards using manual metal arc welding process
MEM05047B	Weld using flux core arc welding process
MEM05048B	Perform advanced welding using flux core arc welding process
MEM05049B	Perform routine gas tungsten arc welding
MEM05050B	Perform routine gas metal arc welding
MEM05051A	Select welding processes
MEM05052A	Apply safe welding practices
MEM05053A	Set and edit computer controlled thermal cutting machines

Unit code	Unit title
MEM05054A	Write basic NC/CNC programs for thermal cutting machines
MEM06001B	Perform hand forging
MEM06002B	Perform hammer forging
MEM06003C	Carry out heat treatment
MEM06004B	Select heat treatment processes and test finished product
MEM06005B	Perform drop and upset forging
MEM06006C	Repair springs
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing
MEM06008A	Hammer forge complex shapes
MEM06009A	Hand forge complex shapes
MEM07001B	Perform operational maintenance of machines/equipment
MEM07002B	Perform precision shaping/planing/slotting operations
MEM07003B	Perform machine setting (routine)
MEM07004B	Perform machine setting (complex)
MEM07005C	Perform general machining
MEM07006C	Perform lathe operations
MEM07007C	Perform milling operations
MEM07008D	Perform grinding operations
MEM07009B	Perform precision jig boring operations
MEM07010B	Perform tool and cutter grinding operations
MEM07011B	Perform complex milling operations
MEM07012B	Perform complex grinding operations
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines

Unit code	Unit title
MEM07014B	Perform electro-discharge (EDM) machining operations
MEM07015B	Set computer controlled machines/processes
MEM07016C	Set and edit computer controlled machines/processes
MEM07018C	Write basic NC/CNC programs
MEM07019C	Program NC/CNC machining centre
MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre
MEM07021B	Perform complex lathe operations
MEM07022C	Program CNC wire cut machines
MEM07023C	Program and set up CNC manufacturing cell
MEM07024B	Operate and monitor machine/process
MEM07025B	Perform advanced machine/process operation
MEM07026B	Perform advanced plastic processing
MEM07027B	Perform advanced press operations
MEM07028B	Operate computer controlled machines/processes
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters
MEM07030C	Perform metal spinning lathe operations (basic)
MEM07031C	Perform metal spinning lathe operations (complex)
MEM07032B	Use workshop machines for basic operations
MEM07033B	Operate and monitor basic boiler
MEM07034A	Operate and monitor intermediate class boiler
MEM07039A	Write programs for industrial robots
MEM07040A	Set multistage integrated processes
MEM07041A	Perform production machining

Unit code	Unit title
MEM08001B	Perform wire, jig and barrel load/unload work
MEM08002C	Pre-treat work for subsequent surface coating
MEM08003C	Perform electroplating operations
MEM08004B	Finish work using wet, dry and vapour deposition methods
MEM08005B	Prepare and produce specialised coatings
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium
MEM08007B	Control surface finish production and finished product quality
MEM08008B	Operate and control surface finishing waste treatment process
MEM08009C	Make up solutions
MEM08010B	Manually finish/polish materials
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
MEM08018B	Electroplate engineering coatings
MEM08019B	Electroplate protective finishes
MEM08020B	Electroplate decorative finishes
MEM09002B	Interpret technical drawing
MEM09003B	Prepare basic engineering drawing
MEM09004B	Perform electrical/electronic detail drafting
MEM09005B	Perform basic engineering detail drafting

Unit code	Unit title
MEM09006B	Perform advanced engineering detail drafting
MEM09007B	Perform advanced mechanical detail drafting
MEM09008B	Perform advanced structural detail drafting
MEM09009C	Create 2D drawings using computer aided design system
MEM09010C	Create 3D models using computer aided design system
MEM09011B	Apply basic engineering design concepts
MEM09021B	Interpret and produce curved 3-dimensional shapes
MEM09022A	Create 2D code files using computer aided manufacturing system
MEM09023A	Create 3D code files using computer aided manufacturing system
MEM09143A	Represent aeronautical engineering designs
MEM09144A	Represent avionic engineering designs
MEM09153A	Apply computer-aided modelling and data management techniques to aeronautical engineering designs
MEM09154A	Apply computer-aided modelling and data management techniques to avionic engineering designs
MEM09155A	Prepare mechanical models for computer-aided engineering
MEM09156A	Prepare mechatronic models for computer-aided engineering
MEM09157A	Perform mechanical engineering design drafting
MEM09158A	Perform mechatronics engineering design drafting
MEM09201A	Work effectively in an engineering drafting workplace
MEM09202A	Produce freehand sketches
MEM09203A	Measure and sketch site information
MEM09204A	Produce basic engineering detail drawings
MEM09205A	Produce electrical schematic drawings
MEM09206A	Produce drawings for mechanical services

Unit code	Unit title
MEM09207A	Produce drawings for reticulated services
MEM09208A	Detail fasteners and locking devices in mechanical drawings
MEM09209A	Detail bearings, seals and other componentry in mechanical drawings
MEM09210A	Create 3-D solid models using computer-aided design (CAD) system
MEM09211A	Produce drawings or models for industrial piping
MEM09212A	Produce detailed drawings of steel to non-steel connections
MEM09213A	Produce schematic drawings for hydraulic and pneumatic fluid power systems
MEM09214A	Perform advanced engineering detail drafting
MEM09215A	Supervise detail drafting projects
MEM09216A	Interpret and produce curved 3-D shapes and patterns
MEM09217A	Prepare plans for pipe and duct fabrication
MEM09218A	Participate in drafting projects for building services
MEM09219A	Prepare drawings for fabricated sheet metal products
MEM09220A	Apply surface modelling techniques to 3-D drawings
MEM09221A	Create 3-D model assemblies using computer-aided design (CAD) system
MEM09222A	Interpret and maintain or restore original drawings
MEM10001C	Erect structures
MEM10002B	Terminate and connect electrical wiring
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.
MEM10004B	Enter and change programmable controller operational parameters
MEM10005B	Commission programmable controller programs
MEM10006B	Install machine/plant

Unit code	Unit title
MEM10007C	Modify control systems
MEM10008B	Undertake commissioning procedures for plant and/or equipment
MEM10009B	Install refrigeration and air conditioning plant and equipment
MEM10010B	Install pipework and pipework assemblies
MEM10011B	Terminate and connect specialist cables
MEM10013A	Install split air conditioning systems and associated pipework
MEM11001C	Erect/dismantle scaffolding and equipment
MEM11002C	Erect/dismantle complex scaffolding and equipment
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment
MEM11004B	Undertake dogging
MEM11005B	Pick and process order
MEM11006B	Perform production packaging
MEM11007B	Administer inventory procedures
MEM11008B	Package materials (stores and warehouse)
MEM11009B	Handle/move bulk fluids/gases
MEM11010B	Operate mobile load shifting equipment
MEM11011B	Undertake manual handling
MEM11012B	Purchase materials
MEM11013B	Undertake warehouse receipt process
MEM11014B	Undertake warehouse dispatch process
MEM11015B	Manage warehouse inventory system
MEM11016B	Order materials
MEM11017B	Organise and lead stocktakes
MEM11018B	Organise and maintain warehouse stock receipt and/or dispatch system

Unit code	Unit title
MEM11019B	Undertake tool store procedures
MEM11020B	Perform advanced warehouse computer operations
MEM11021B	Perform advanced operation of load shifting equipment
MEM11022B	Operate fixed/moveable load shifting equipment
MEM11023A	Operate a bridge and gantry crane
MEM11024A	Undertake basic rigging
MEM11025A	Operate a non-slewing mobile crane of greater than three tonnes capacity
MEM12001B	Use comparison and basic measuring devices
MEM12002B	Perform electrical/electronic measurement
MEM12003B	Perform precision mechanical measurement
MEM12004B	Perform precision electrical/electronic measurement
MEM12005B	Calibrate measuring equipment
MEM12006C	Mark off/out (general engineering)
MEM12007D	Mark off/out structural fabrications and shapes
MEM12019B	Measure components using coordinate measuring machine
MEM12020B	Set and operate coordinate measuring machine
MEM12021B	Program coordinate measuring machine
MEM12022B	Program coordinate measuring machine (advanced)
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM12025A	Use graphical techniques and perform simple statistical computations
MEM13001B	Perform emergency first aid
MEM13002B	Undertake occupational health and safety activities in the workplace
MEM13003B	Work safely with industrial chemicals and materials

Unit code	Unit title
MEM13004B	Work safely with molten metals/glass
MEM13006B	Collect and evaluate occupational health and safety data for an enterprise or section of an enterprise
MEM13007B	Maintain water treatment systems for cooling towers
MEM13010A	Supervise occupational health and safety in an industrial work environment
MEM13013B	Work safely with ionizing 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
MEM14065A	Plan and design aeronautical engineering projects
MEM14066A	Plan and design avionic engineering projects
MEM14083A	Apply aeronautical engineering fundamentals to support design and development of engineering projects
MEM14084A	Apply avionic engineering fundamentals to support design and development of engineering projects
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

Unit code	Unit title
MEM14091A	Integrate manufacturing fundamentals into an engineering task
MEM14092A	Integrate maintenance fundamentals into an engineering task
MEM15001B	Perform basic statistical quality control
MEM15002A	Apply quality systems
MEM15003B	Use improvement processes in team activities
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 the application of quality procedures
MEM15015B	Examine trading practices
MEM15016B	Inspect pre-packed articles
MEM15017B	Use and maintain reference standards
MEM15018B	Investigate consumer complaints
MEM15019B	Conduct a field inspection
MEM15020C	Perform verification/certification or in-service inspection
MEM15021C	Conduct audits of servicing licensees and public weighbridge licensees
MEM15022B	Verify reference standards
MEM15024A	Apply quality procedures
MEM16001B	Give formal presentations and take part in meetings
MEM16002C	Conduct formal interviews and negotiations
MEM16003B	Provide advanced customer service

Unit code	Unit title
MEM16004B	Perform internal/external customer service
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM16009A	Research and analyse engineering information
MEM16010A	Write reports
MEM16011A	Communicate with individuals and small groups
MEM16012A	Interpret technical specifications and manuals
MEM16013A	Operate in a self-directed team
MEM16014A	Report technical information
MEM17001B	Assist in development and deliver training in the workplace
MEM17002B	Conduct workplace assessment
MEM17003A	Assist in the provision of on the job training
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM18003C	Use tools for precision work
MEM18004B	Maintain and overhaul mechanical equipment
MEM18005B	Perform fault diagnosis, installation and removal of bearings
MEM18006C	Repair and fit engineering components
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies
MEM18008B	Balance equipment

Unit code	Unit title
MEM18009B	Perform levelling and alignment of machines and engineering components
MEM18010C	Perform equipment condition monitoring and recording
MEM18011C	Shut down and isolate machines/equipment
MEM18012B	Perform installation and removal of mechanical seals
MEM18013B	Perform gland packing
MEM18014B	Manufacture press tools and gauges
MEM18015B	Maintain tools and dies
MEM18016B	Analyse plant and equipment condition monitoring results
MEM18017C	Modify mechanical systems and equipment
MEM18018C	Maintain pneumatic system components
MEM18019B	Maintain pneumatic systems
MEM18020B	Maintain hydraulic system components
MEM18021B	Maintain hydraulic systems
MEM18022B	Maintain fluid power controls
MEM18023B	Modify fluid power system operation
MEM18024B	Maintain engine cooling systems
MEM18025B	Service combustion engines
MEM18026C	Test compression ignition fuel systems
MEM18027C	Overhaul engine fuel system components
MEM18028B	Maintain engine lubrication systems
MEM18029B	Tune diesel engines
MEM18030B	Diagnose and rectify low voltage electrical systems
MEM18031B	Diagnose and rectify low voltage starting systems

Unit code	Unit title
MEM18032B	Maintain induction/exhaust systems
MEM18033B	Perform engine bottom-end overhaul
MEM18034B	Perform engine top-end overhaul
MEM18035B	Diagnose and rectify braking systems
MEM18037B	Diagnose and rectify low voltage charging systems
MEM18038B	Maintain wheels and tyres
MEM18039B	Diagnose and rectify track type undercarriage
MEM18040B	Maintain suspension systems
MEM18041B	Maintain steering systems
MEM18042C	Diagnose and rectify manual transmissions
MEM18043C	Diagnose and rectify automatic transmissions
MEM18044C	Diagnose and rectify drive line and final drives
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant
MEM18048B	Fault find and repair/rectify basic electrical circuits
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.
MEM18050C	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.
MEM18051B	Fault find repair/rectify complex electrical circuits
MEM18052B	Maintain fluid power systems for mobile plant
MEM18053B	Modify fluid power control systems
MEM18054B	Fault find, test and calibrate instrumentation systems and equipment

Unit code	Unit title
MEM18055B	Dismantle, replace and assemble engineering components
MEM18056B	Diagnose and repair analog equipment and components
MEM18057B	Maintain/service analog/digital electronic equipment
MEM18058C	Modify electronic equipment
MEM18059B	Modify electronic systems
MEM18060B	Maintain, repair control instrumentation – single and multiple loop control systems
MEM18061B	Maintain/calibrate complex control systems
MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements
MEM18063B	Terminate signal and data cables
MEM18064B	Maintain instrumentation system components
MEM18065B	Diagnose and repair digital equipment and components
MEM18066B	Diagnose and repair microprocessor-based equipment
MEM18067B	Tune control loops – multi controller or multi element systems
MEM18069B	Maintain, repair instrumentation process control analysers
MEM18070C	Modify complex electrical circuits and systems
MEM18071B	Connect/disconnect fluid conveying system components
MEM18072B	Manufacture fluid conveying conductor assemblies
MEM18073A	Perform advanced equipment testing and diagnostics on mobile plant and equipment
MEM18084A	Commission and decommission split air conditioning systems
MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances
MEM18086B	Test, recover, evacuate and charge refrigeration systems
MEM18087B	Service and repair domestic and light commercial refrigeration and air

Unit code	Unit title
	conditioning equipment
MEM18088B	Maintain and repair commercial air conditioning systems and components
MEM18089B	Maintain and repair central air handling systems
MEM18090B	Maintain and repair industrial refrigeration systems and components
MEM18091B	Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems
MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls
MEM18093B	Maintain and repair integrated industrial refrigeration and/or large air handling system controls
MEM18094B	Service and repair commercial refrigeration
MEM18095A	Maintain and repair cooling towers/evaporative condensers and associated equipment
MEM18096A	Maintain, repair/replace and adjust refrigerant flow controls and associated equipment
MEM18097A	Manufacture cavity dies
MEM18098A	Prepare to perform work associated with fuel system installation and servicing
MEM19001B	Perform jewellery metal casting
MEM19002B	Prepare jewellery illustrations
MEM19003B	Handle gem materials
MEM19004B	Handle and examine gemstone materials
MEM19005B	Produce three-dimensional precision items
MEM19006B	Replace watch batteries
MEM19007B	Perform gemstone setting
MEM19008B	Prepare jewellery designs
MEM19009B	Perform investment procedures for lost wax casting process

Unit code	Unit title
MEM19010B	Produce rubber moulds for lost wax casting process
MEM19011B	Perform wax injection of moulds for lost wax casting process
MEM19012B	Produce jewellery wax model
MEM19013B	Produce jewellery metal masters
MEM19014B	Perform hand engraving
MEM19015B	Perform jewellery enamelling
MEM19016B	Construct jewellery components
MEM19017B	Fabricate jewellery items
MEM19018B	Repair jewellery items
MEM19020B	Fault-find and maintain micro-mechanisms
MEM19021B	Diagnose and service micro-mechanisms
MEM19022B	Perform precision micro-mechanism diagnosis and servicing
MEM19023A	Apply drawing and rendering techniques to jewellery or object design
MEM19024A	Use CAD to create and display 3D jewellery and object models
MEM19025A	Create and present designs for jewellery and other 3D objects
MEM19026A	Investigate quality and application of jewellery materials
MEM19027A	Produce life drawings for presenting jewellery and object designs
MEM19028A	Select materials and new technologies for jewellery and 3D object design applications
MEM19029A	Produce a professional jewellery design and 3D object portfolio
MEM19030A	Research and design sustainable objects
MEM19031A	Produce renderings and technical drawings for jewellery and object design construction
MEM19032A	Design and implement mechanisms in jewellery items
MEM19033A	Create silversmithing objects

Unit code	Unit title
MEM19034A	Apply chain manufacture process
MEM19035A	Plan and apply casting techniques for jewellery and object designs
MEM19036A	Use specialised techniques to produce jewellery and objects
MEM19037A	Plan and implement chenier fabrication process
MEM19038A	Apply traditional techniques to jewellery and 3D object production
MEM19039A	Plan, conduct and supervise a jewellery and object exhibition
MEM19040A	Create and manufacture jewellery or object design prototypes for the mass market
MEM19041A	Experiment with jewellery or object designs
MEM19042A	Render images using computer graphics software
MEM19043A	Oversee jewellery or object design production
MEM19044A	Repair and restore antique jewellery
MEM19045A	Set gems in channel style settings
MEM19046A	Apply grain setting techniques
MEM19047A	Set gems in claw and bezel style settings
MEM19048A	Develop and apply complex borders and decorations for hand engraving
MEM19049A	Develop and apply heraldic designs for hand engraving
MEM19050A	Hand carve engraving work
MEM19051A	Construct multiple stone settings
MEM19052A	Produce complex objects using silversmithing techniques
MEM19053A	Create complex findings and mechanisms for jewellery items
MEM19054A	Fabricate platinum jewellery items
MEM20001A	Produce keys
MEM20002A	Assemble and test lock mechanisms

Unit code	Unit title
MEM20003A	Install and upgrade locks and hardware
MEM20004A	Gain entry
MEM20005A	Install and maintain door control devices/systems
MEM20006A	Maintain and service mechanical locking devices
MEM20007A	Plan and prepare a masterkey system
MEM20008A	Develop and implement a masterkey system
MEM20009A	Gain entry and reinstate fire and security containers
MEM20010A	Gain entry and reinstate automotive locking systems
MEM20011A	Service and repair fire and security containers
MEM20012A	Service and repair mechanical automotive locking systems
MEM20013A	Service automotive transponder systems
MEM20014A	Perform a site security survey
MEM21001A	Replace watch batteries, capacitors and bands
MEM21002A	Perform watch movement exchange
MEM21003A	Perform watch case servicing, repair and refurbishment
MEM21004A	Clean watch and clock components
MEM21005A	Diagnose faults in quartz watches
MEM21006A	Service quartz watches
MEM21007A	Service complex quartz watches
MEM21008A	Service mechanical watches
MEM21009A	Inspect, diagnose, adjust and repair mechanical watches
MEM21010A	Service watch power generating systems
MEM21011A	Service calendar and other dial indication mechanisms for watches
MEM21012A	Service and repair mechanical watch oscillating systems

Unit code	Unit title
MEM21013A	Service, test and adjust watch escapements
MEM21014A	Service mechanical chronograph watches
MEM21015A	Perform precision watch timing and adjustment
MEM21016A	Install and set up clocks
MEM21017A	Service and repair clock timepieces
MEM21018A	Service clock escapements and oscillating systems
MEM21019A	Service and repair clock striking mechanisms
MEM21020A	Service and repair clock chiming mechanisms
MEM21021A	Restore clockwork mechanisms
MEM21022A	Manufacture watch and clock components
MEM21023A	Plan, set up and operate horological workshop or service centre
MEM22001A	Perform engineering activities
MEM22002A	Manage self in the engineering environment
MEM22007A	Manage environmental effects of engineering activities
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 requirements
MEM22017A	Coordinate continuous improvement and technical development
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
MEM23005A	Apply statistics and probability techniques to engineering tasks

Unit code	Unit title
MEM23006A	Apply fluid and thermodynamics principles in engineering
MEM23007A	Apply calculus to engineering tasks
MEM23008A	Apply advanced algebra and numerical methods to engineering tasks
MEM23052A	Apply basic electro and control scientific principles and techniques in aeronautical engineering situations
MEM23063A	Select and test mechanical engineering materials
MEM23064A	Select and test mechatronic engineering materials
MEM23073A	Select and apply aeronautical engineering methods, processes and construction techniques
MEM23074A	Select and apply avionic engineering methods, processes and construction techniques
MEM23084A	Apply scientific principles and techniques in aeronautical engineering situations
MEM23086A	Apply scientific principles and techniques in avionic engineering situations
MEM23095A	Apply aeronautical system design principles and techniques in aeronautical engineering situations
MEM23096A	Apply avionic system design principles and techniques in avionic engineering situations
MEM23097A	Apply automated systems principles and techniques in aeronautical engineering situations
MEM23098A	Apply automated systems principles and techniques in avionic engineering situations
MEM23109A	Apply engineering mechanic principles
MEM23111A	Select electrical equipment and components for engineering applications
MEM23112A	Investigate electrical and electronic controllers in engineering applications
MEM23113A	Evaluate hydrodynamic systems and system components
MEM23114A	Evaluate thermodynamic systems and components

Unit code	Unit title
MEM23115A	Evaluate fluid power systems
MEM23116A	Evaluate programmable logic controller and related control system component applications
MEM23117A	Evaluate microcontroller applications
MEM23118A	Apply production and service control techniques
	Apply mathematical techniques in a manufacturing, engineering or related environment
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
MEM23126A	Evaluate industrial robotic applications
MEM23129A	Evaluate thermal loads in heating, ventilation, air conditioning and refrigeration
MEM23130A	Coordinate servicing and fault-finding of HVAC/R control systems
MEM23131A	Evaluate rapid prototyping applications
MEM23132A	Evaluate rapid manufacturing processes
MEM23133A	Evaluate rapid tooling applications
MEM23134A	Evaluate jigs and fixtures
MEM23135A	Evaluate moulding tools and processes
MEM23136A	Evaluate stamping and forging tools
MEM23137A	Evaluate rolling tools and processes

Unit code	Unit title
MEM23138A	Evaluate suitability of materials for engineering-related applications
MEM23139A	Design a basic single zone duct distribution system
MEM23140A	Determine operational parameters for building HVAC hydronic systems
MEM23141A	Complete a building thermal performance survey
MEM23142A	Determine psychrometric processes and system performance
MEM23143A	Apply energy management principles
MEM23144A	Contribute to the design of a commercial refrigeration system
MEM23145A	Apply codes and regulations to air conditioning designs
MEM23146A	Contribute to the design of industrial refrigeration systems
MEM23147A	Contribute to the design of hydronic systems
MEM23148A	Develop energy management solutions
MEM23149A	Contribute to the design of commercial and industrial exhaust systems
MEM23150A	Contribute to the design of heating systems
MEM23151A	Commission and optimise performance of HVAC/R systems
MEM23152A	Apply principles of refrigeration food storage technology
MEM23153A	Contribute to the design of heat exchanger systems
MEM23154A	Analyse and service HVAC/R systems
MEM234001A	Plan and manage engineering-related projects or operations
MEM234002A	Integrate engineering technologies
MEM234003A	Design machines and ancillary equipment
MEM234004A	Design for engineering-related noise and vibration mitigation
MEM234005A	Design hydrodynamic pumping systems
MEM234006A	Evaluate and select thermodynamic systems or sub-systems

Unit code	Unit title
MEM234007A	Design fluid power systems
MEM234008A	Design plant using computer simulations
MEM234009A	Design computer-integrated manufacturing systems
MEM234010A	Design microcontroller applications
MEM234011A	Design programmable logic controller applications
MEM234012A	Design integrated maintenance management systems
MEM234013A	Plan and design engineering-related manufacturing processes
MEM234014A	Design a robotic system
MEM234015A	Design hydronic heat exchanger systems
MEM234016A	Design refrigeration systems
MEM234017A	Design exhaust, ventilation and dust collection systems
MEM234018A	Design heating, ventilation, air conditioning and refrigeration control systems
MEM234019A	Apply finite element analysis in engineering design
MEM234020A	Coordinate small lot manufacture using rapid manufacture processes
MEM234021A	Apply statistics to technology problems
MEM234022A	Apply advanced calculus to technology problems
MEM234023A	Apply differential equations to technology problems
MEM234024A	Apply advanced mathematics in technology problems
MEM234025A	Apply numerical methods to technology problems
MEM234026A	Develop and coordinate engineering-related contingency plans
MEM234027A	Plan and manage materials supply for an engineering project or manufacturing operation
MEM234028A	Produce and manage technical documentation
MEM234029A	Produce and manage technical publications

Unit code	Unit title
MEM234030A	Provide specialised technical and engineering guidance to other technical employees
MEM234031A	Manage installation, commissioning or modification of machines and equipment
MEM234032A	Manage fluid power related technologies in an enterprise
MEM234033A	Lead engineering-related quality operations in an enterprise
MEM234034A	Manage heating, ventilation, air conditioning and refrigeration systems or projects
MEM234035A	Maintain and apply technical and engineering skills
MEM234036A	Apply configuration management procedures in engineering project management
MEM234037A	Perform maintenance-related integrated logistic support management activities
MEM234038A	Apply systems engineering procedures to engineering design project management
MEM24001B	Perform basic penetrant testing
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
MEM24012C	Apply metallurgy principles

Unit code	Unit title
MEM25001B	Apply fibre-reinforced materials
MEM25002B	Form and integrate fibre-reinforced structures
MEM25003B	Set up marine vessel structures
MEM25004B	Fair and shape surfaces
MEM25005B	Construct and assemble marine vessel timber components
MEM25006B	Undertake marine sheathing operations
MEM25007B	Maintain marine vessel surfaces
MEM25008B	Repair marine vessel surfaces and structures
MEM25009B	Form timber shapes using hot processes
MEM25010B	Perform fitout procedures
MEM25011B	Install marine systems
MEM25012B	Install and test operations of marine auxiliary systems
MEM25013B	Produce three-dimensional plugs/moulds
MEM25014B	Perform marine slipping operations
MEM25015A	Assemble and install equipment and accessories/ancillaries
MEM26001A	Lay up composites using open moulding techniques
MEM26002A	Lay up composites using vacuum closed moulding techniques
MEM26003A	Lay up composites using pressure closed moulding techniques
MEM26004A	Make basic plugs for composites fabrication
MEM26005A	Make basic moulds for composites fabrication
MEM26006A	Mark and cut out sheets for composite use
MEM26007A	Select and use reinforcing appropriate for product
MEM26008A	Select and use resin systems appropriate for product
MEM26009A	Select and use cores and fillers appropriate for product

Unit code	Unit title
MEM26010A	Store and handle composite materials
MEM26011A	Determine materials and techniques for a composite component or product
MEM26012A	Record and trial work processes for one-off composite products
MEM26013A	Select and use composite processes or systems appropriate for product
MEM26014A	Adjust resin chemicals for current conditions
MEM26015A	Select and apply repair techniques
MEM26016A	Select and use joining techniques
MEM26017A	Prepare composite or other substrate surfaces
MEM26018A	Organise composite trials
MEM26019A	Finish a composite product
MEM26020A	Identify and interpret required standards for composites
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
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

Unit code	Unit title
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
MEM30026A	Select and test components for simple electronic switching and timing circuits
MEM30027A	Prepare basic programs for programmable logic controllers
MEM30028A	Assist in sales of technical products/systems
MEM30029A	Use workshop equipment and processes to complete an engineering project
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
MEM50001B	Classify recreational boating technologies and features
MEM50002B	Work safely on marine craft
MEM50003B	Follow work procedures to maintain the marine environment
MEM50004B	Maintain quality of environment by following marina codes
MEM50005B	Refuel vessels

Unit code	Unit title
MEM50006B	Check operational capability of marine craft
MEM50007B	Check operational capability of sails and sail operating equipment
MEM50008B	Carry out trip preparation and planning
MEM50009B	Safely operate a mechanically powered recreational boat
MEM50010B	Respond to boating emergencies and incidents

List of Imported units in MEM Training Package

Code	Title
AURV225908A	Carry out panel repairs
BSBCM401A	Make a presentation
BSBCRT401A	Articulate, present and debate ideas
BSBCRT402A	Collaborate in a creative process
BSBCRT501A	Originate and develop concepts
BSBCRT601A	Research and apply concepts and theories of creativity
BSBDES402A	Interpret and respond to a design brief
BSBDES502A	Establish, negotiate and refine a design brief
BSBDES601A	Manage design realisation
BSBDES602A	Research global design trends
BSBDES701A	Research and apply design theory
BSBIPR401A	Use and respect copyright
BSBIPR501A	Manage intellectual property to protect and grow business
BSBLED705A	Plan and implement a mentoring program
BSBLED706A	Plan and implement a coaching strategy

BSBLED710A	Develop human capital
BSBPMG510A	Manage projects
BSBREL701A	Develop and cultivate collaborative partnerships and relationships
BSBSMB403A	Market the small business
BSBSMB405A	Monitor and manage small business operations
BSBSMB406A	Manage small business finances
CPCCLDG3001A	Licence to perform dogging
CPCCLRG3001A	Licence to perform rigging basic level
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level
CPCCOHS1001A	Work safely in the construction industry
CPCPCM4002A	Estimate and cost work
CPPBDN5013A	Develop and collaborate on building information models for small-scale building design projects
CUFIND201A	Develop and apply creative arts industry knowledge
CUFRES401A	Conduct research
CUVACD304A	Make scale models
CUVACD504A	Research and apply light and colour
CUVACD506A	Refine 2-D design ideas and processes
CUVACD507A	Refine 3-D design ideas and processes
CUVACD512A	Work with photomedia in creative practice
CUVACD601A	Extend professional expertise with drawing and other visual representation tools
CUVDES403A	Research and apply techniques for the design of wearable objects
CUVDIG401A	Experiment with techniques to enhance digital images
CUVDIG501A	Refine digital art techniques

CUVDRA501A	Refine drawing techniques
CUVDRA502A	Investigate drawing materials and processes
CUVGRD301A	Prepare files for publication
CUVJWL401A	Experiment with techniques to produce jewellery
CUVPHI302A	Capture photographic images
CUVPHI403A	Apply photo imaging lighting techniques
CUVPRP403A	Select and organise finished work for storage
CUVPRP405A	Develop and discuss ideas for own creative work
CUVPRP501A	Realise a body of creative work
CUVPRP502A	Prepare for sustainable professional practice
CUVPRP503A	Present a body of own creative work
CUVPRP601A	Originate a body of independent creative work
CUVPRP602A	Collaborate in professional creative projects
CUVPRP603A	Engage in the business of creative practice
CUVPRP604A	Publicly present a body of own creative work
CUVRES502A	Analyse cultural history and theory
CUVRES601A	Extend cultural research expertise
FDFOP2005A	Work in a socially diverse environment
ICTTC136B	Install, maintain and modify customer premises communications cabling: ACA Restricted Rule
ICTTC137B	Install, maintain and modify customer premises communications cabling: ACA Open Rule
LMFFDT4012A	Produce ideation drawings
LMTGN4002A	Participate in product engineering
MEA101B	Interpret occupational health and safety practices in aviation maintenance

MEA105C	Apply quality standards applicable to aviation maintenance processes
MEA107B	Interpret and use aviation maintenance industry manuals and specifications
MEA108B	Complete aviation maintenance industry documentation
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance
MEA270A	Lay out avionic systems
MEA271A	Lay out avionic flight management systems
MEA272B	Apply basic scientific principles and techniques in avionic engineering situations
MEA273A	Select and test avionic engineering materials
MEA340A	Lay out and set up aircraft systems
MEA341A	Apply basic aircraft design characteristics
MEA342A	Apply basic aircraft power plant design characteristics
MEA349B	Apply basic scientific principles and techniques in aeronautical engineering situations
MEA350A	Select and test aeronautical engineering materials
MSS402002A	Sustain process improvements
MSS402030A	Apply cost factors to work practices
MSS402051A	Apply quality standards
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
MSS403023A	Monitor a levelled pull system of operations
MSS403030A	Improve cost factors in work practices
MSS403032A	Analyse manual handling processes
MSS403040A	Facilitate and improve implementation of 5S
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
MSS405005A	Manage competitive systems and practices in an organisation responding to individual and unique customer orders
MSS405007A	Introduce competitive systems and practices to a small or medium enterprise
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 a product or process costs in terms of customer requirements
MSS405032A	Analyse cost implications of maintenance strategy
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
MSS407001A	Prepare for and implement change
MSS407002A	Review operations practice tools and techniques
MSS407003A	Analyse process changes
MSS407004A	Facilitate improvements in the internal value stream
MSS407005A	Undertake a qualitative review of a process change
MSS407006A	Build relationships between teams in an operations environment
MSS407007A	Respond to a major non-conformance
MSS407008A	Capture learning from daily activities in a organisation
MSS407009A	Facilitate improvements in the external value stream
MSS407010A	Improve visual management in the workplace

MSS407011A	Manage benchmarking studies
MSS407012A	Lead a problem solving process to determine and solve root cause
MSS407013A	Review continuous improvement processes
MSS408001A	Develop the competitive systems and practices approach
MSS408002A	Audit the use of competitive tools
MSS408003A	Develop models of future state operations practice
MSS408004A	Develop the value stream
MSS408005A	Develop the learning processes of the operations organisation
MSS408006A	Develop and refine systems for continuous improvement in operations
MSS408007A	Develop problem solving capability of a organisation
MSS408008A	Analyse data for relevance to organisational learning
MSAENV272B	Participate in environmentally sustainable work practices
MSAENV472B	Implement and monitor environmentally sustainable work practices
MSAENV672B	Develop workplace policy and procedures for environmental sustainability
MSATCM304A	Interpret basic binary phase diagrams
MSATCS301A	Interpret architectural and 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
MSATCS504A	Detail ancillary steelwork
MSL976003A	Evaluate and select appropriate test methods and procedures
PMBPROD291B	Operate resin infusion moulding equipment

PMBPROD294B	Operate resin transfer moulding equipment
PMBPROD298B	Operate equipment using pre-pregs material
PMBPROD391B	Produce composites using resin infusion
PMBPROD394B	Produce composites using resin transfer moulding
PMBPROD398B	Produce composites using pre-pregs
PRSTS202A	Install security equipment/system
PRSTS302A	Program security equipment/system
PRSTS303A	Test installed security equipment/system
PRSTS304A	Commission/decommission security equipment/system
PRSTS305A	Identify and diagnose electronic security equipment/ system fault
PRSTS307A	Maintain and service security equipment/system
PRSTS317A	Provide estimate and quote
PRSTS319A	Modify and repair security equipment/system
SIRXSL001A	Sell products and services
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)
TLILIC2001A	Licence to operate a forklift truck
TLILIC2002A	Licence to operate an order picking forklift truck
TLILIC3003A	Licence to operate a bridge and gantry crane
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)
UEPMNT419A	Perform Civil Drafting

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 people's 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 Skills Standards Council (NSSC).

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?

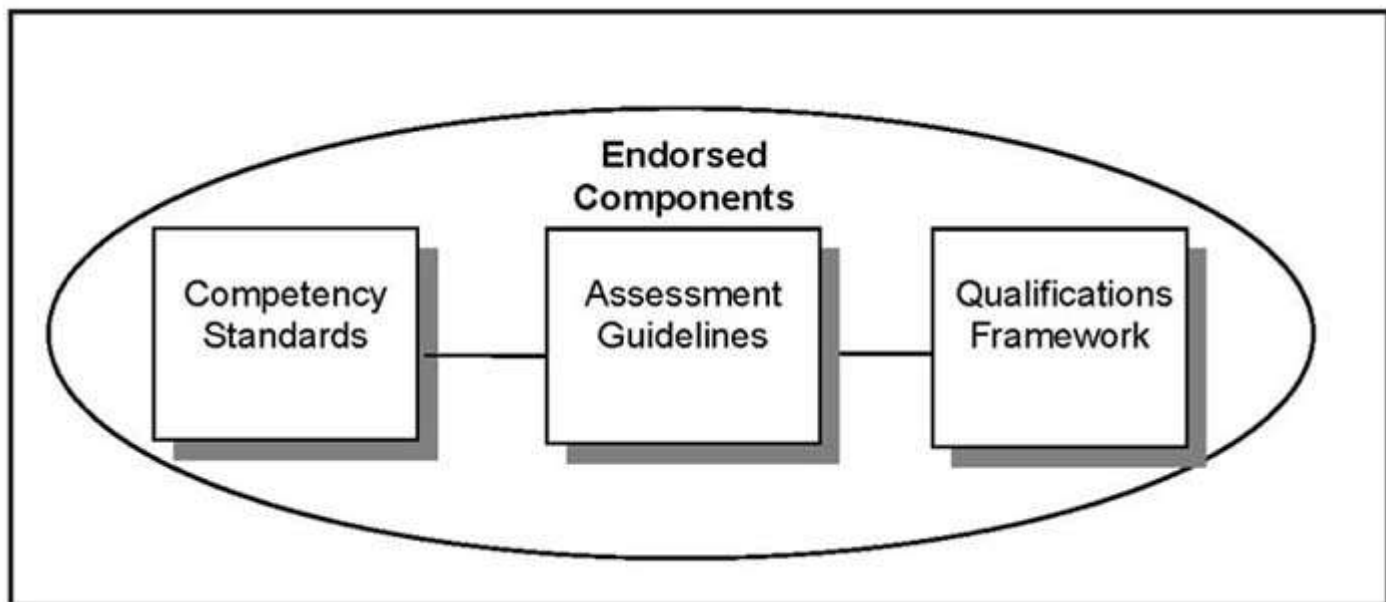
Training and assessment using Training Packages must be conducted by a Registered Training Organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO, as specified in the AQTF 2010.

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.

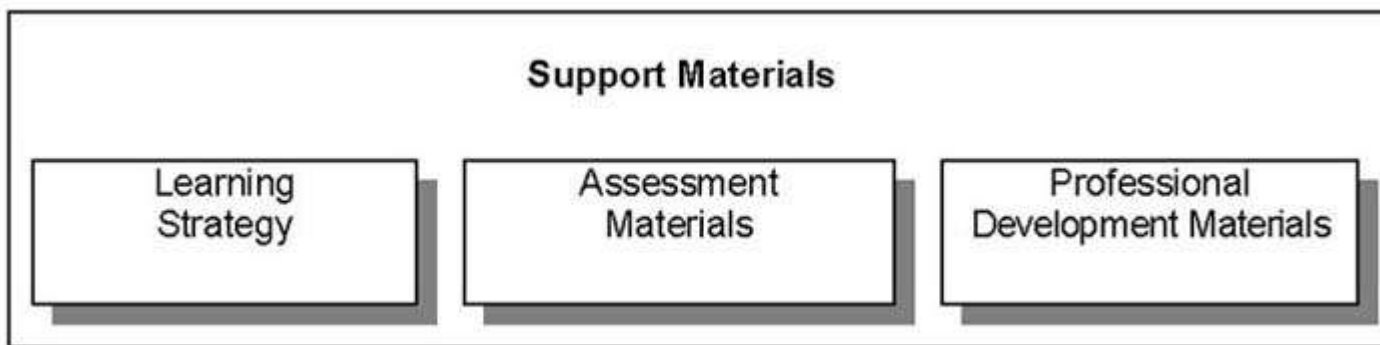
Qualifications Framework

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.

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 MEM05. 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 MEM10105. 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 MEM04020A;
- the first three characters signify the Training Package - MEM05 - in the above example and up to eight characters, relating to an industry sector, function or skill area, follow;
- 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:

- MEM10105 Certificate I in Engineering

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:

- MEM03001B Perform manual production assembly

The revised MEM05 Metal and Engineering Training Package

The MEM05 Metal and Engineering Training Package was developed to replace the MEM98 Metal and Engineering Training Package. The Training Package is designed to meet the training and skills recognition needs of the Australian engineering industry sector. It covers the competencies used by people employed in the manufacturing, engineering and related services industries.

It also provides access to the apprenticeship streams provided by the National Metal and Engineering Industry Competency Standards leading to national qualifications, with traineeship pathways also available. It also enables further career advancement beyond trade apprenticeship and technical traineeship, with progression to Advanced Diploma.

New qualifications for technical workers were added to MEM05 to more accurately reflect the nature of their work. These qualifications make a distinction between technical work and that of tradespersons. In particular, a new Diploma and Advanced Diploma of Engineering were developed to meet the needs of technical workers and para-professionals in the engineering field. For the current Training Package, four disciplines were selected as priority areas. These disciplines are as follows:

- Mechanical
- Mechatronics
- Maintenance
- Manufacturing

Other disciplines will be added to the qualifications over the life of the Training Package.

There occurred a simplification of some of the qualification titles, as well as changes to the list of qualification descriptors that may be added by RTOs.

The bank of units of competency was revised and extended. Part of the revision included bringing all units to the current approved format. Further information was added to each unit to assist users.

Qualifications 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.

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.

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 selection 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

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
- 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.
- 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.
-

MEM05 Qualification Pathways

The following pathways charts are provided to show the types of pathways into and from qualifications that are possible with this Training Package. For more information about qualifications and pathways contact Manufacturing Industry Skills Council (<http://www.mskills.com.au>)

Approved occupational or functional pathway descriptors for use in qualification titles are listed in the section below - Qualification titles - additional descriptors.

Reference to other occupational or functional pathways may be included on any qualification statement that is issued. This could be achieved by adding a 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 Engineering - Production Systems

CNC machine operations pathway

Example 2

Certificate III in Engineering - Production Systems

Achieved through the CNC machine operations pathway

Competency ‘fields’ may give some guidance when selecting units of competency to suit a particular qualification industry descriptor and/or occupational or functional descriptor. For instance, the Maintenance and Diagnostics field contains units that may be suitable for the qualification in the above example focussing on Mechanical Trade (Refrigeration and Air-conditioning).

Note that fields do not set up barriers to accessing the various qualifications. Units may be drawn from a number of fields to form a qualification. More information on competency fields can be found in the section Competency standards overview.

Prerequisite Units and Paths

The prerequisite units section within a unit of competency indicates whether other specific competencies are required to support those competencies included in that particular unit. For example: A person must have the competencies included in the unit MEM13004B Work safely with molten metals/glass before they can acquire the competencies required by a number of other units in the Casting and Moulding field, such as MEM04001B Operate melting furnaces.

Where there are options within the pre-requisites then separate combinations or paths are shown. Where multiple paths (path 1, path 2 etc.) are shown then the most appropriate path should be chosen.

Qualification Pathways

There are many ways in which a person can gain a national qualification. Existing employees, trainees, apprentices, or pre-employment students may obtain qualifications. The achievement of competence is what matters, not the way in which it is achieved.

Possible pathways may include:

- assessment only pathway
- combination of on-the-job and institution-based training
- institution-based training programs
- on-the-job training

Skills recognition pathways including New Apprenticeships

The Metal and Engineering Training Package provides national qualification outcomes based on recognition of competency achievement. These qualifications can be accessed through traineeship and apprenticeship pathways available under the New Apprenticeship System.

These qualifications may also be achieved through other pathways which do not involve a contract of training, such as recognition of prior learning.

However in all cases, achievement or recognition of competence is necessary in all of the required units of competency to be awarded a national qualification.

Customisation of qualifications

Selection and use of Units of Competency

All qualifications in the Metal and Engineering Training Package have the capacity for customisation to suit the needs of enterprises and learners. Options for selecting units of competency are included to enable customised training pathways to be followed and recognised by a qualification. In addition, the Range of Variables in the units of competency are designed to provide sufficient scope for the application of the units across the spectrum of work performed in Metal and Engineering and related industries.

There is further scope for customisation of each qualification through the inclusion of units of competency drawn from other endorsed Training Packages. RTOs should exercise care to ensure that those units do not duplicate existing MEM05 units. The packaging rules for each qualification provide further information on how much of each qualification can be comprised of non-MEM05 units of competency. The selection of the units of competency applies where the non-MEM05 units are available for inclusion at the same qualification level.

NOTE:

MEM05 also contains "imported" units of competency. These units are formally introduced by MSA into MEM05 from other training packages. Imported units form part of the bank of available units in selected qualifications. They do not relate to the customisation guidelines in the preceding paragraph.

It is the responsibility of the RTO to determine the relative points value of any units drawn from other Training Packages. When determining the equivalent points value of non-MEM05 units the following factors should be considered:

- the complexity of the skill
- the amount of required knowledge and experience needed
- the amount of on and off the job training required
- the 'size' of the unit in terms of its use in the source qualification

- the relative ‘value’ of the unit in comparison with other units selected.

Recognition of a person’s existing competencies is accommodated through the relevant processes described in the Assessment Guidelines section of this Training Package.

Qualification titles - additional descriptors

An additional descriptor may be added to some qualification titles to illustrate a particular skills profile. This may be achieved by the addition of an occupational/functional pathway descriptor after the qualification title as shown on the qualification and/or transcript. This additional descriptor must be drawn from the approved list provided for each qualification and must be shown in brackets. For example, Certificate III in Engineering - Mechanical Trade (Refrigeration and Air-conditioning). There are no specific requirements associated with the use of these descriptors other than their use should reflect the choice of units of competency in the qualification. No other changes may be made to the qualification titles. Note that the addition of one of these descriptors to a qualification does not change the qualification’s formal title or unique national code.

Reference to other occupational or functional pathways may be included on any qualification statement that is issued. This could be achieved by adding a pathway descriptor or sentence below the formal title of the qualification.

A summary of approved additional descriptors for qualification titles is shown below.

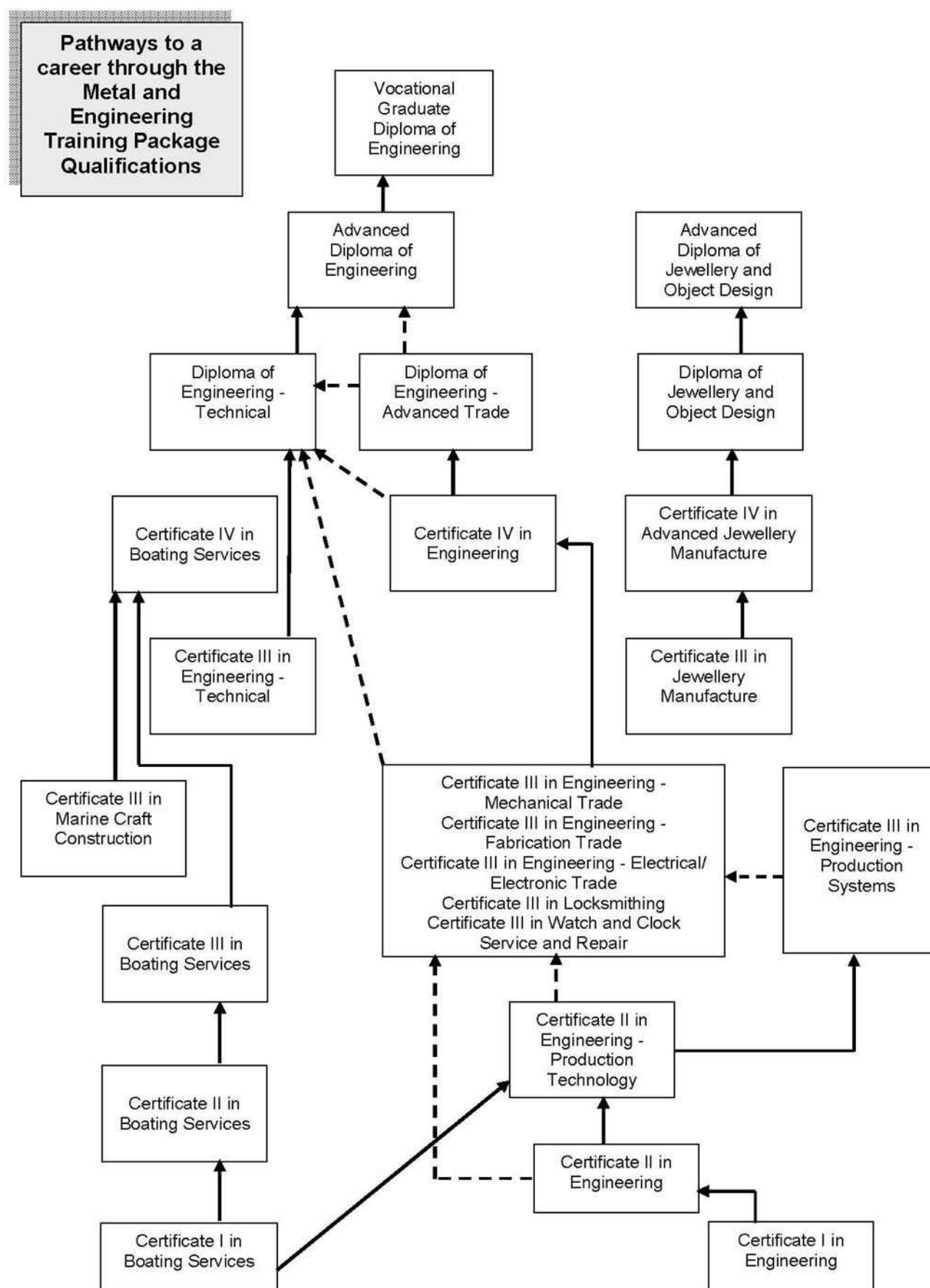
Summary of approved additional descriptors for qualification titles

Code	Title	Approved additional descriptors
MEM10105	Certificate I in Engineering	There are no approved additional descriptors for this qualification
MEM10205	Certificate I in Boating Services	There are no approved additional descriptors for this qualification
MEM20105	Certificate II in Engineering	Marine craft manufacturing; Surface finishing.
MEM20205	Certificate II in Engineering - Production Technology	Marine craft manufacturing; Surface finishing, Marine Craft Surface Finishing
MEM20305	Certificate II in Boating Services	There are no approved additional descriptors for this qualification

MEM30105	Certificate III in Engineering - Production Systems	Surface finishing, Marine Craft Surface Finishing
MEM30205	Certificate III in Engineering - Mechanical Trade	Refrigeration and Air-conditioning; Instrumentation; Maintenance; Patternmaking, Toolmaking; Watchmaking Machining.
MEM30305	Certificate III in Engineering - Fabrication Trade	Casting and Moulding; Heavy Fabrication; Light Fabrication; Maintenance; Patternmaking; Surface Finishing; Welding.
MEM30405	Certificate III in Engineering - Electrical/Electronic Trade	Refrigeration and Air-conditioning; Instrumentation; Maintenance; Marine Electronics.
MEM30505	Certificate III in Engineering - Technical	There are no approved additional descriptors for this qualification
MEM30605	Certificate III in Jewellery Manufacture	There are no approved additional descriptors for this qualification
MEM30705	Certificate III in Marine Craft Construction	There are no approved additional descriptors for this qualification
MEM30805	Certificate III in Locksmithing	There are no approved additional descriptors for this qualification
MEM30905	Certificate III in Boating Services	There are no approved additional descriptors for this qualification
MEM31010	Certificate III in Watch and Clock Service and Repair	There are no approved additional descriptors for this qualification
MEM31112	Certificate III in Engineering (Composites Trade)	There are no approved additional descriptors for this qualification
MEM40105	Certificate IV in Engineering	Refrigeration and Air-conditioning; Casting and Moulding; CNC programming; Fluid Power; Heavy Fabrication; Instrumentation; Maintenance; Marine Electronics; Mechatronics; Patternmaking; Robotics; Toolmaking; Welding, Watch and Clock Service and Repair
MEM40205	Certificate IV in Boating Services	There are no approved additional

		descriptors for this qualification
MEM40311	Certificate IV in Advanced Jewellery Manufacture	There are no approved additional descriptors for this qualification
MEM40412	Certificate IV in Engineering Drafting	There are no approved additional descriptors for this qualification
MEM50105	Diploma of Engineering - Advanced Trade	Refrigeration and Air conditioning; Casting and Moulding; CNC programming; Fluid Power; Heavy Fabrication; Instrumentation; Maintenance; Marine Electronics; Mechatronics; Metrology; Non-Destructive Testing; Patternmaking; Robotics; Toolmaking; Welding, Watch and Clock Service and Repair
MEM50212	Diploma of Engineering - Technical	Mechanical, Mechatronics, Manufacturing, Maintenance, Aeronautical, Avionic
MEM50311	Diploma of Jewellery and Object Design	There are no approved additional descriptors for this qualification
MEM60112	Advanced Diploma of Engineering	Mechanical, Mechatronics, Manufacturing, Maintenance, Aeronautical, Avionic
MEM60211	Advanced Diploma of Jewellery and Object Design	There are no approved additional descriptors for the qualification
MEM80112	Vocational Graduate Diploma of Engineering	There are no approved additional descriptors for the qualification

MEM05 Qualification Pathways Diagram

**NOTES:**

- The arrows signify normal progression pathways
- All qualifications allow for direct entry
- Most qualifications allow for credit – according to units completed

Skill Sets

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.

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

Skill Sets in this Training Package

No Skill Sets have been developed for MEM05 at this time

Historical and General Information

The Metal and Engineering Industry

The various sectors of the metal and engineering industry comprise about 50% of Australia's manufacturing industry in terms of value added share. In general, 85% of these industry sectors are comprised of small to medium enterprises. Each sector is involved in the manufacture, service and repair, and maintenance of products, tooling and equipment, as well as processes.

Engineering installation, repair and maintenance is also applied across most Australian industries. This aspect of applied engineering includes significant numbers of workers. Workforce numbers counted by industry and occupational classifications alone are misleading and unreliable. The current estimate of numbers of workers across Australian industries who are using engineering and manufacturing-engineering skills is approximately 650,000. The majority of these workers are not clearly identified in industry data and many are recorded as workers in other industries such as hospitals, retail etc.

MEM05v9

The Metal and Engineering Training Package qualifications for engineering technicians and paraprofessionals were first endorsed in 2005, and cover the four engineering disciplines of mechanical, mechatronic, manufacturing and maintenance engineering.

Since endorsement of MEM05 Metal and Engineering Training Package, technology has advanced and it was identified in the MSA Continuous Improvement Plan in 2009 that there was a need to develop new units and update many individual units in the technician/paraprofessional qualifications. As well, MSA received requests to develop units in additional areas of technology, such as rapid manufacturing and heating, ventilation, air conditioning and refrigeration (HVAC/R).

The new units have been included as additional electives, with no change to the packaging rules. All the MEM05 Metal and Engineering Training Package qualifications will be reviewed in 2013 as part of the MEM05 review/streamlining project which commenced August 2012.

In addition to the 73 new technician units, one new unit of competency has been developed in response to an approach from Sutton Tools (Maryborough in Victoria) in conjunction with Bendigo TAFE in 2011, to address the need for a new unit of competency for developing production machining skills for training existing workers in complex machine setting skills. Sutton Tools is one of the world's largest independent family owned cutting tool companies producing high-quality precision cutting tools for the industrial, trade and DIY markets. Sutton Tools is one of three companies chosen to feature in this year's Australian Made, Australian Grown (AMAG) 'Keep Australians Working' campaign. This new unit of competency will typically apply to senior operators undertaking volume production who have responsibility for machine set up to defined parameters, selection of materials and lubricants, establishment of datum points and basic marking out, as well as setting speeds, feeds and other machining parameters. This unit will be a new elective in the MEM20205 Certificate II in Engineering - Production Technology and MEM30105 Certificate III in Engineering - Production Systems and other qualifications requiring production machining skills.

MEM05v8

Project background

Drafting skills are widely used in many industry sectors within engineering and manufacturing and vary from basic entry of information into computer-aided design/drafting (CAD) files to participation in engineering design and the development of highly complex sets of drawings. The growth of CAD has seen a major change in drafting practice as manual drafting skills have become less standard. Most enterprises now use CAD software as the preferred means of generating design or detail drawings.

While the production of detail drawings is important to many sectors with MSA's coverage, for example, furnishing and textiles, clothing and footwear, this project was focused on the occupational outcomes of detail drafter, as well as CAD and drafting skills that are required by occupations covered by the MEM05 Metal and Engineering Training Package. The CAD skills of other industries in MSA's coverage will be addressed in the continuous improvement work being conducted for each sector.

The review and development of CAD skills was undertaken as part of a broader project to review the current MEM Diploma and Advanced Diploma engineering qualifications. This reflects the greater underpinning engineering skills and knowledge required for CAD which makes it less feasible to review design drafting as a separate activity.

The key industry drivers for change include:

- Changes to drafting software and hardware technology and consequent changes to skill application in the development of detail drawings.
- A requirement for more specific detail drawing skills for specialised industry sectors, for example, mechanical services, where current skill and knowledge coverage was not seen to be adequately addressed through more generic CAD units.
- Feedback since the MEM 2005 Review that changes in work roles and technology were leading to difficulty in accessing enough appropriate CAD units to package a well targeted qualification to meet a variety of industry applications.
- Inconsistency of AQF alignment and approach to delivering CAD training across Australia, with both Training Package and state/territory accredited training available at different times in a number of states/territories. In particular, the draft qualifications and units of competency covered by this submission will replace a state accredited course in NSW at the Certificate III level.

MEM05v7 Background

Composites trade certificate

Background

Manufacturing Skills Australia (MSA) were approached in 2009 by Composites Australia (CA), representing the composites sector, as well as the Queensland Department of Employment, Economic Development and Innovation seeking assistance in having the sector gain trade recognition by developing a trade Certificate III for the composites sector.

The composites sector is currently growing in importance as an employer as well as a supplier of fabricated component and products. Its reach goes from marine to aerospace as well as covering a wide range of everyday products. Composites are steadily replacing many traditional materials as well as allowing movement into areas where traditional materials would not be suitable. It is expanding into traditional metal fabrication and construction areas.

The development of a qualification to support a trade required wide national consultation with industry and the industrial parties. MSA contracted Total Training and Performance Solutions (TaPS) to undertake work on this project.

Industry drivers for change

The major industry drivers for the development of this qualification are outlined below:

- Industry and relevant agencies have requested assistance in having the sector gain trade recognition by developing a trade Certificate III for the composites sector.
- This is a sector which is growing and expanding into traditional metal fabrication and construction areas

While there are currently qualifications recognising production skills for this sector, there are no qualifications recognising the need for trade skills. The increasing technical sophistication of this sector is a further justification for the development of a trade qualification.

Aluminothermic welding

Background

Early in 2011 MSA was approached by members of the Hydrocarbons Assessor Network to assist with developing a unit of competency to meet the skills needs of employees and contractors who undertake aluminothermic welding in a field/remote environment.

MSA supported the development of a new unit of competency for this application and commissioned Total Training and Performance Solutions to undertake the work.

Industry drivers for change

The industry reported to MSA that:

- aluminothermic welding is undertaken by process workers and contractors working in this sector
- the only existing unit available is specific to welding of rail and not applicable to this application
- there are safety and environmental issues in undertaking aluminothermic welding in this environment, as well as issues regarding consistency of training and assessment arising from the lack of a relevant endorsed unit of competency.

Industry representatives and RTOs advise that the addition of the new unit of competency to existing MEM qualifications will provide the basis for ensuring adequately skilled workers are undertaking this work, often in remote locations, in a developing sector.

MEM05v6 Background

Vocational Graduate Diploma of Engineering

Project Background

The project to develop the Vocational Graduate Diploma of Engineering was initiated in response to a request from the Manufacturing and Engineering Skills Advisory Board of Victoria for a Training Package based qualification to replace the current State accredited Advanced Diploma of Engineering - Principal Technical Officer qualification.

The development work for the qualification was undertaken by Richard Jenkins & Associates in conjunction with industry technical advisors. The project was overseen by the MSA MEM Board Sub-Committee. Consultations with industry organisations and Engineers Australia indicated national support for the development of a national qualification that would align to the accepted industry occupation of Principal Technical Officer.

Meeting Industry Needs

Paraprofessional engineering personnel are employed in many sectors and areas of manufacturing. The major Training Package covering the work of these paraprofessionals in manufacturing industry is the MEM05 Metal and Engineering Training Package. However, this Training Package has not had vocational qualifications aligned to all of the accepted skill levels for paraprofessional work especially those levels requiring a mixture of technical and technical leadership positions. In particular there has not been a national qualification to match the Principal Technical Officer level in industry. This level is recognised in relevant Awards and Agreements, including in some cases, variations of the Principal Technical Officer title. The MEM80111 Vocational Graduate Diploma of Engineering which is now being submitted for endorsement will be the first national qualification to align to the Principal Technical Officer occupation.

The MEM80111 Vocational Graduate Diploma of Engineering also meets the needs of industry for a vocational qualification to align to the internationally accepted designation of Engineering Technologist. This level is recognised through an Accord of Engineering Associations known as the Sydney Accord. The signatory body in Australia is Engineers Australia which has given support for the endorsement of the MEM80111 Vocational Graduate Diploma of Engineering. Engineers Australia has also offered to assist MSA in promoting the MEM80111 Vocational Graduate Diploma of Engineering and in developing promotional and explanatory material.

Certificate IV in Advanced Jewellery Manufacture

Project background

The MEM40311 Certificate IV in Advanced Jewellery Manufacture has been specifically developed to be delivered to people who are existing jewellery tradespersons or delivered to apprentices in a jewellery-related trade who choose to study at a higher level during their apprenticeship. 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 formal skills recognition processes.

Meeting industry needs

The jewellery design and manufacture industry in Australia generates approximately \$889.5 million in revenue, contributing an estimated \$227.1 million to the Australian GDP while employing about 4,191 people. (*IBISWorld Industry Report C2941 Jewellery Manufacturing in Australia, December 2009 Raghu Rajakumar*).

Employees within the industry design and manufacture a range of jewellery and object products, including custom-made, one-off designs, mass produced designs, costume jewellery, mint coins, badges, medals and church ware. Typically workers work with silverware, precious or semi-precious metal and stones. Industry operators may also be involved with designing, manufacturing, engraving, chasing or etching jewellery or precious metal, and selling these products to wholesalers or in certain instances, directly to retailers.

Current coverage within the MEM05 Metal and Engineering Training Package targets the Certificate III trade level outcome which provides the essential technical skills for jewellery manufacturers. This new Certificate IV qualification addresses industry need for more extensive and specialised skills in areas such as engraving and gem setting, and covers skills required to work with a greater range of materials and more complex items. It builds upon trade level skills and encompasses some design units to support a well-rounded outcome for those providing custom-made items.

The revised MEM05 Metal and Engineering Training Package

The MEM05 Metal and Engineering Training Package was developed to replace the MEM98 Metal and Engineering Training Package. The Training Package is designed to meet the training and skills recognition needs of the Australian engineering industry sector. It covers the competencies used by people employed in the manufacturing, engineering and related services industries.

It also provides access to the apprenticeship streams provided by the National Metal and Engineering Industry Competency Standards leading to national qualifications, with traineeship pathways also available. It also enables further career advancement beyond trade apprenticeship and technical traineeship, with progression to Advanced Diploma.

New qualifications for technical workers were added to MEM05 to more accurately reflect the nature of their work. These qualifications make a distinction between technical work and that of tradespersons. In particular, a new Diploma and Advanced Diploma of Engineering were developed to meet the needs of technical workers and para-professionals in the engineering field. For the current Training Package, four disciplines were selected as priority areas. These disciplines are as follows:

- Mechanical
- Mechatronics
- Maintenance
- Manufacturing

Other disciplines will be added to the qualifications over the life of the training package.

There occurred a simplification of some of the qualification titles, as well as changes to the list of qualification descriptors that may be added by RTOs.

The bank of units of competency was revised and extended. Part of the revision included bringing all units to the current approved format. Further information was added to each unit to assist users.

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
- 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	<ul style="list-style-type: none">• 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 <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • working across different ages irrespective of gender, race, religion or political persuasion • working as an individual and as a member of 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • managing time and priorities - setting time

to long and short-term strategic planning	<p>lines, coordinating tasks for self and with others</p> <ul style="list-style-type: none"> • 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 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

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.
-

Examples from this Training Package of Employability Skills

Unit component	Example of embedded Employability Skill
Unit Title	Manufacture watch and clock components
Unit Descriptor	This unit competency covers manufacturing watch and clock components using a range of general and specialist machines and engineering techniques.
Element	Plan and organise the project
Performance Criteria	Select appropriate equipment and tools to undertake process

Unit component	Example of embedded Employability Skill Plan suitable method of production Undertake measurements to task tolerances
Range Statement	Working drawings may include sketch or illustration by hand, including dimensions Replacement parts may include wheels and pinions, arbors and pivots, click springs, ratchet wheel, setting lever springs.
Required Skills and Knowledge	Interpreting watch and clock drawings, manuals and other documentation that provide information of part design and tolerances Performing milling operations using milling attachment on a watch and clockmaker's lathe or a bench mill. Knowledge of typical materials used in watch and clock making Selecting and preparing cutting tools.
Evidence Guide	Manufacture, finish and fit replacement watch or clock components to original tolerances. Select and use appropriate hand tools.

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/registration requirements; and assessment pathways.

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
- specific industry requirements
- 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
- conduct of assessment.

Validity

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

- (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

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

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, assessment or client service must be competent for the functions they perform. 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 Statements of Attainment

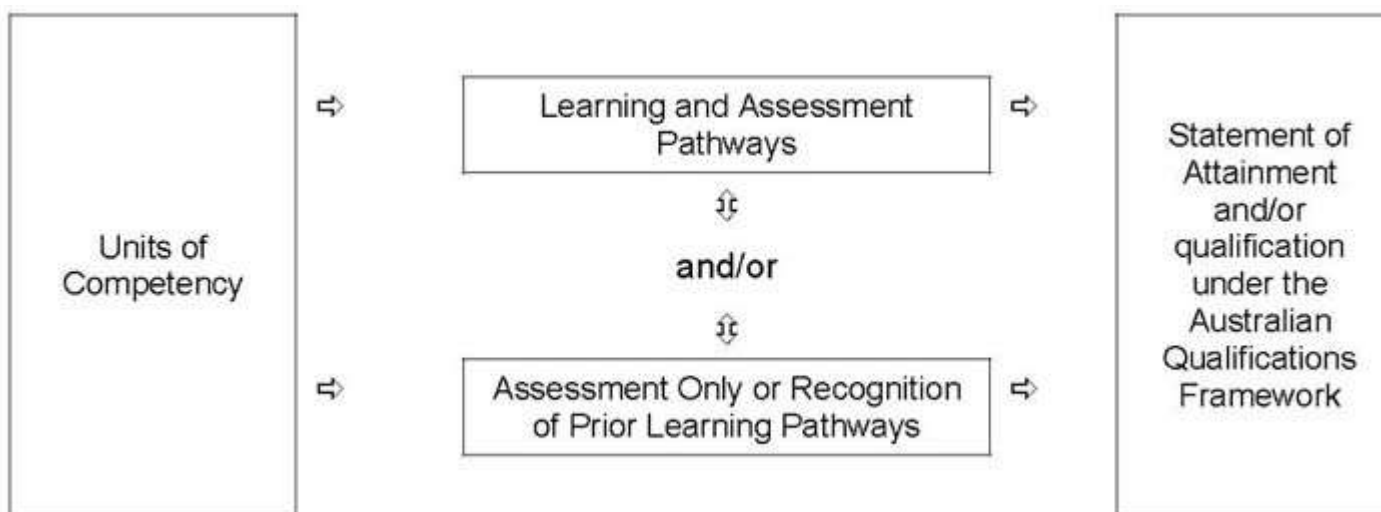
Each RTO must issue AQF qualifications and Statements of Attainment that meet the requirements of the current AQF Implementation Handbook and the endorsed Training Packages within the scope of its registration. An AQF qualification is issued once the full requirements for a qualification, as specified 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>.

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, an assessment-only or recognition pathway, or a combination of the two as illustrated in the following diagram.



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, and the AQTF, where relevant, the Australian Qualifications Framework.

Learning and Assessment Pathways

Usually, learning and assessment are integrated, with assessment evidence being collected and feedback provided to the candidate at any time 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

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

The availability of 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 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.

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.

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 is delivered 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 developing 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 judgments 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

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.training.gov.au >.

Developing Assessment Tools

When developing assessment tools, assessors must ensure that they:

- are benchmarked against the relevant unit or units of competency
- are reviewed as part of the continuous improvement of assessment strategies as required under Standard 1 of the AQTF 2007
- meet the assessment requirements expressed in Standard 1 of 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 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:

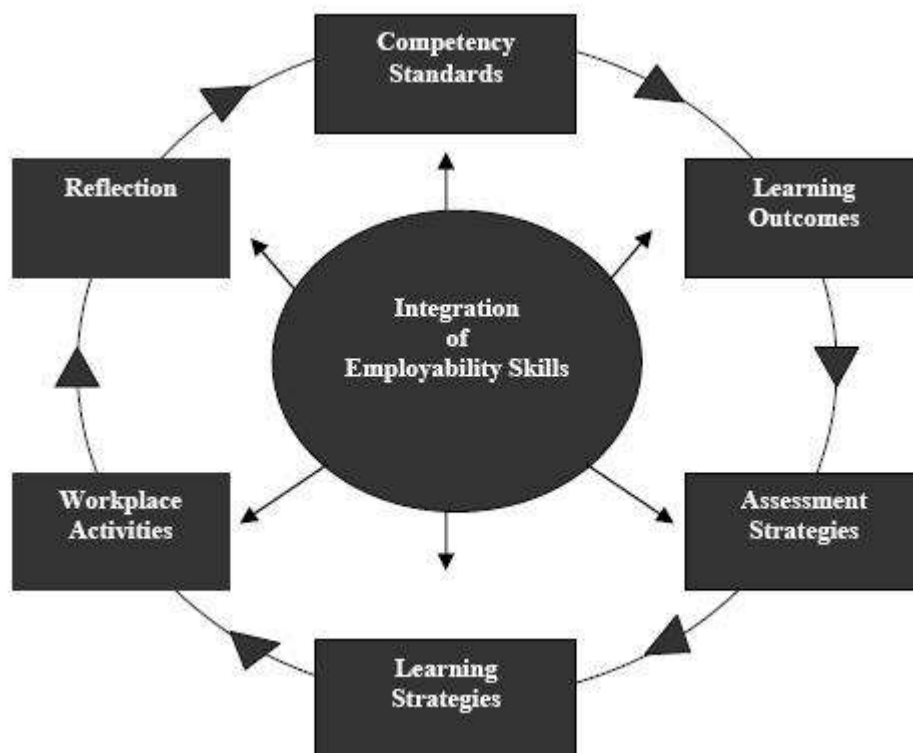
1.5 Assessment, including Recognition of Prior Learning:

- 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, and
- c) meets workplace and, where relevant, regulatory requirements.

d) is systematically validated.

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 and explicit 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/>>.

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 Industry Skills Council Training Packages go to the Manufacturing Industry Skills Council website at <http://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>.

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

Manufacturing Skills Australia

Street Address

Level 3, 104 Mount Street

North Sydney NSW 2060

Postal Address :

PO Box 289

North Sydney NSW 2059

Ph: +612 9955 5500

Fax: +612 9955 8044

Email: info@mskills.com.au

Web: 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>

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.training.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>

Assessment 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/>

MEM05 Assessment Advice

It is important that assessors are familiar with the use of the Metal and Engineering Competency Standards and the agreed industrial processes for their implementation in workplaces. Manufacturing Skills Australia can provide a list of approved organisations that provide an Implementing Competency Standards Program that will assist assessors.

Advice on integrated assessment

The Metal and Engineering Training Package is comprised of units of competency that will rarely be used in isolation. All units will form part of a person's job role. No single unit of competency can be acquired in isolation and therefore opportunities for integrated learning and assessment activities should always be explored. Careful consideration of the profile of competencies will identify groups of units where integrated assessment (or co-assessment) can be applied.

Adoption of integrated assessment can provide significant savings in time, cost and effort of assessors and candidates. Assessment tools should be designed so that assessment evidence can be gathered for a group of units and the outcomes identified with those units. This approach can be quite adequately used to also deal with prerequisites.

Advice on assessment of Prerequisite Units

The Metal and Engineering Training Package units of competency are built on a structure of accumulated skills and knowledge. This means that there are hierarchies of skills and knowledge that are built up from a range of competencies. Any units of competency that underpin others are listed as prerequisites.

The use of the term 'prerequisite' has been used for many years in the Metal and Engineering units of competency. In terms of training delivery and assessment, the term 'prerequisite' means that a person cannot be deemed 'competent' in the higher level unit until they are deemed competent in the prerequisite units. An RTO may choose an integrated assessment approach (see above). In this case the actual assessment of prerequisites may occur concurrently with other units.

MEM05 Licensing requirements

Specific licenses may be required in some jobs. The local regulations should be checked for details. The industry is generally subject to a range of regulatory control. These vary with the nature of the work and to some extent on its location as most regulations are State based and some are enforced by local government. This Training Package allows for these differences without mandating them to specific units of competency which would not be appropriate.

Selected units of competency and qualifications in this Training Package have been designed to satisfy or partly satisfy the licensing requirements of various industry sectors.

This Metal and Engineering Training Package publication provides advisory information based on discussions with representatives of industry and regulators. All possible care has been taken in the preparation of this material, however, persons should not rely solely on this publication on matters involving industry specific current or proposed licensing requirements or arrangements.

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.

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

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

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	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
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	Manufacture watch and clock components
Unit Descriptor	This unit competency covers manufacturing watch and clock

	components using a range of general and specialist machines and engineering techniques.
Element	Plan and organise the project
Performance Criteria	Select appropriate equipment and tools to undertake process Plan suitable method of production Undertake measurements to task tolerances
Range Statement	Working drawings may include sketch or illustration by hand, including dimensions Replacement parts may include wheels and pinions, arbors and pivots, click springs, ratchet wheel, setting lever springs.
Required Skills and Knowledge	Interpreting watch and clock drawings, manuals and other documentation that provide information of part design and tolerances Performing milling operations using milling attachment on a watch and clockmaker's lathe or a bench mill.
	Knowledge of typical materials used in watch and clock making Selecting and preparing cutting tools.
Evidence Guide	Manufacture, finish and fit replacement watch or clock components to original tolerances. Select and use appropriate hand tools.

Competency Standards - MEM05 Industry Contextualisation

Prerequisite Units and Prerequisite Pathways – MEM05

The Metal and Engineering Training Package units of competency are built on a structure of accumulated skills and knowledge. This means that there are hierarchies of skills and knowledge that are built up from a range of competencies. This may have an impact on training and assessment delivery strategies.

Any units of competency that underpin others are listed as prerequisites. In some cases there are options within the prerequisites. These combinations reflect the fact that different "skill paths" may be taken to reach a unit of competency. Where multiple paths (path 1, path 2, etc.) are shown, then the most appropriate path should be chosen. Unless indicated otherwise, the prerequisite units should be counted in the total number of units (and points) that contribute towards the qualification.

Competency Field

The competency standards are divided into ‘fields’ as convenient groupings of units to assist the organisation of the standards and to help users in the selection of relevant competency standards. The fields do not set up barriers to accessing any competency units in a field, or between fields.

Application of the Competency

This sub-section describes more of the unit of competency’s scope and limitation as well as purpose and operation in different contexts, for example, by showing how it applies in the workplace.

Related units

This section provides an indication of other units that may also be required in particular circumstances as well as indications of alternatives.

Band

Many of the units of competency are also divided into ‘bands’, with some overlap between them. The allocation of units to different bands recognises the inherent differences in the level of difficulty of skills used in the industry. For example, band B skills are more difficult than band A skills. At the same time the large range of units in each band allows enterprises a wide choice. Band E units are independent units developed for the boating services qualifications.

Some units are regarded as both band A and band B units. Use of these dual band units is limited. These units are identified in the units themselves by way of a note.

Unit Weight

Many units of competency have an allocated weight shown as ‘unit weight’. This weighting is usually referred to as ‘points’. These points weightings are used in the packaging rules for some of the qualifications. The units selected for the qualification must have a combined points value no less than the points value specified for the various components of the qualification. These combined points totals also include the points for any prerequisite units involved.

Note that the points for any particular unit can only be counted once in each qualification. For example, if a unit is selected to be part of a qualification and it is also a prerequisite for another selected unit, then the points for that unit can only be counted once.

Notes

Special notes are included in some units, for example, where the unit is a dual band unit.

Appendix 1: Certificate III Trade Specialisation Units

Units from the Trade Specialisation units list below may be selected to bring the total value of Stream and Specialisation units to at least 73 points, including any prerequisites for the following certificates:

MEM30205 Certificate III in Engineering - Mechanical Trade

MEM30305 Certificate III in Engineering - Fabrication Trade

MEM30405 Certificate III in Engineering - Electrical/Electronic Trade

MEM30605 Certificate III in Jewellery Manufacture

MEM30705 Certificate III in Marine Craft Construction

MEM30805 Certificate III in Locksmithing

MEM31010 Certificate III in Watch and Clock Service and Repair

Specialisation units

Unit code	Unit title	P
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly	4
MEM03003B	Perform sheet and plate assembly	4
MEM03004B	Perform electronic/electrical assembly (production)	8
MEM03005B	Rework and repair (electrical/electronic production)	8
MEM03006B	Set assembly stations	2
MEM04001B	Operate melting furnaces	4
MEM04002B	Perform gravity die casting	2
MEM04003B	Operate pressure die casting machine	4
MEM04004B	Prepare and mix sand for metal moulding	4
MEM04005C	Produce moulds and cores by hand (jobbing)	16
MEM04006B	Operate sand moulding and core making machines	8

Unit code	Unit title	P
MEM04007B	Pour molten metal	4
MEM04008B	Fettle and trim metal castings/forgings	4
MEM04010B	Develop and manufacture wood patterns	20
MEM04011B	Produce polymer patterns	8
MEM04012B	Assemble plated patterns	8
MEM04013B	Develop and manufacture polystyrene patterns	2
MEM04014B	Develop and manufacture production patterns	8
MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment	6
MEM04016C	Develop and manufacture precision models	6
MEM04017B	Develop and manufacture gear, conveyor screw and propeller patterns	4
MEM04018B	Perform general woodworking machine operations	4
MEM04019B	Perform refractory installation and repair	4
MEM04020A	Supervise individual ferrous melting and casting operation	4
MEM04021A	Supervise individual non ferrous melting and casting operation	4
MEM04022A	Examine appropriateness of methoding for mould design	4
MEM04023A	Undertake prescribed tests on foundry related materials	4
MEM05001B	Perform manual soldering/desoldering – electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4
MEM05003B	Perform soft soldering	2
MEM05004C	Perform routine oxy acetylene welding	2
MEM05005B	Carry out mechanical cutting	2
MEM05006B	Perform brazing and/or silver soldering	2

Unit code	Unit title	P
MEM05007C	Perform manual heating and thermal cutting	2
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping	2
MEM05009C	Perform automated thermal cutting	2
MEM05010C	Apply fabrication, forming and shaping techniques	8
MEM05011D	Assemble fabricated components	8
MEM05012C	Perform routine manual metal arc welding	2
MEM05013C	Perform manual production welding	2
MEM05014C	Monitor quality of production welding/fabrications	2
MEM05015D	Weld using manual metal arc welding process	4
MEM05016C	Perform advanced welding using manual metal arc welding process	4
MEM05017D	Weld using gas metal arc welding process	4
MEM05018C	Perform advanced welding using gas metal arc welding process	4
MEM05019D	Weld using gas tungsten arc welding process	4
MEM05020C	Perform advanced welding using gas tungsten arc welding process	4
MEM05022C	Perform advanced welding using oxy acetylene welding process	6
MEM05023C	Weld using submerged arc welding process	4
MEM05027A	Perform aluminothermic welding	2
MEM05036C	Repair/replace/modify fabrications	4
MEM05037C	Perform geometric development	6
MEM05038B	Perform advanced geometric development – cylindrical/rectangular	2
MEM05039B	Perform advanced geometric development – conical	2
MEM05040B	Perform advanced geometric development – transitions	4

Unit code	Unit title	P
MEM05041B	Weld using powder flame spraying	4
MEM05047B	Weld using flux core arc welding process	4
MEM05048B	Perform advanced welding using flux core arc welding process	4
MEM05049B	Perform routine gas tungsten arc welding	2
MEM05050B	Perform routine gas metal arc welding	2
MEM05051A	Select welding processes	2
MEM05052A	Apply safe welding practices	4
MEM05053A	Set and edit computer controlled thermal cutting machines	4
MEM05054A	Write basic NC/CNC programs for thermal cutting machines	4
MEM06001B	Perform hand forging	4
MEM06002B	Perform hammer forging	4
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6
MEM06005B	Perform drop and upset forging	4
MEM06006C	Repair springs	4
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM06008A	Hammer forge complex shapes	4
MEM06009A	Hand forge complex shapes	4
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07002B	Perform precision shaping/planing/slotting operations	4
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8
MEM07005C	Perform general machining	8

Unit code	Unit title	P
MEM07006C	Perform lathe operations	4
MEM07007C	Perform milling operations	4
MEM07008D	Perform grinding operations	4
MEM07009B	Perform precision jig boring operations	4
MEM07010B	Perform tool and cutter grinding operations	4
MEM07011B	Perform complex milling operations	4
MEM07012B	Perform complex grinding operations	4
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines	4
MEM07014B	Perform electro-discharge (EDM) machining operations	4
MEM07015B	Set computer controlled machines/processes	2
MEM07016C	Set and edit computer controlled machines/processes	4
MEM07018C	Write basic NC/CNC programs	4
MEM07019C	Program NC/CNC machining centre	2
MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre	2
MEM07021B	Perform complex lathe operations	4
MEM07022C	Program CNC wire cut machines	2
MEM07024B	Operate and monitor machine/process	4
MEM07025B	Perform advanced machine/process operation	6
MEM07026B	Perform advanced plastic processing	6
MEM07027B	Perform advanced press operations	6
MEM07028B	Operate computer controlled machines/processes	2
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters	4

Unit code	Unit title	P
MEM07030C	Perform metal spinning lathe operations (basic)	8
MEM07031C	Perform metal spinning lathe operations (complex)	4
MEM07032B	Use workshop machines for basic operations	2
MEM07033B	Operate and monitor basic boiler	6
MEM07034A	Operate and monitor intermediate class boiler	4
MEM07040A	Set multistage integrated processes	6
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2
MEM08007B	Control surface finish production and finished product quality	4
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6

Unit code	Unit title	P
MEM08019B	Electroplate protective finishes	6
MEM08020B	Electroplate decorative finishes	6
MEM09002B	Interpret technical drawing	4
MEM09003B	Prepare basic engineering drawing	8
MEM09005B	Perform basic engineering detail drafting	8
MEM09011B	Apply basic engineering design concepts	6
MEM09021B	Interpret and produce curved 3-dimensional shapes	4
MEM09022A	Create 2D code files using computer aided manufacturing system	4
MEM10001C	Erect structures	4
MEM10002B	Terminate and connect electrical wiring	3
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.	12
MEM10004B	Enter and change programmable controller operational parameters	2
MEM10005B	Commission programmable controller programs	4
MEM10006B	Install machine/plant	4
MEM10009B	Install refrigeration and air conditioning plant and equipment	4
MEM10010B	Install pipework and pipework assemblies	4
MEM10011B	Terminate and connect specialist cables	3
MEM10013A	Install split air conditioning systems and associated pipework	6
MEM11001C	Erect/dismantle scaffolding and equipment	4
MEM11002C	Erect/dismantle complex scaffolding and equipment	4
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	4
MEM11004B	Undertake dogging	4

Unit code	Unit title	P
MEM11005B	Pick and process order	4
MEM11006B	Perform production packaging	2
MEM11007B	Administer inventory procedures	4
MEM11008B	Package materials (stores and warehouse)	2
MEM11009B	Handle/move bulk fluids/gases	4
MEM11010B	Operate mobile load shifting equipment	4
MEM11011B	Undertake manual handling	2
MEM11012B	Purchase materials	6
MEM11013B	Undertake warehouse receipt process	4
MEM11014B	Undertake warehouse dispatch process	4
MEM11015B	Manage warehouse inventory system	6
MEM11016B	Order materials	2
MEM11017B	Organise and lead stocktakes	4
MEM11018B	Organise and maintain warehouse stock receipt and/or dispatch system	6
MEM11019B	Undertake tool store procedures	4
MEM11020B	Perform advanced warehouse computer operations	4
MEM11021B	Perform advanced operation of load shifting equipment	2
MEM11022B	Operate fixed/movable load shifting equipment	4
MEM12001B	Use comparison and basic measuring devices	2
MEM12002B	Perform electrical/electronic measurement	2
MEM12003B	Perform precision mechanical measurement	2
MEM12004B	Perform precision electrical/electronic measurement	4
MEM12006C	Mark off/out (general engineering)	4

Unit code	Unit title	P
MEM12007D	Mark off/out structural fabrications and shapes	4
MEM12019B	Measure components using coordinate measuring machine	4
MEM12020B	Set and operate coordinate measuring machine	2
MEM12021B	Program coordinate measuring machine	4
MEM12022B	Program coordinate measuring machine (advanced)	2
MEM12025A	Use graphical techniques and perform simple statistical computations	2
MEM13001B	Perform emergency first aid	1
MEM13002B	Undertake occupational health and safety activities in the workplace	3
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM13006B	Collect and evaluate occupational health and safety data for an enterprise or section of an enterprise	4
MEM13007B	Maintain water treatment systems for cooling towers	2
MEM13010A	Supervise occupational health and safety in an industrial work environment.	4
MEM13013B	Work safely with ionizing radiation	4
MEM15001B	Perform basic statistical quality control	2
MEM15003B	Use improvement processes in team activities	4
MEM15004B	Perform inspection	2
MEM15005B	Select and control inspection processes and procedures	4
MEM15015B	Examine trading practices	5
MEM15016B	Inspect pre-packed articles	8
MEM15022B	Verify reference standards	8
MEM16001B	Give formal presentations and take part in meetings	2

Unit code	Unit title	P
MEM16002C	Conduct formal interviews and negotiations	4
MEM16004B	Perform internal/external customer service	2
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	2
MEM16011A	Communicate with individuals and small groups	2
MEM16013A	Operate in a self-directed team	2
MEM17001B	Assist in development and deliver training in the workplace	2
MEM17002B	Conduct workplace assessment	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work	4
MEM18004B	Maintain and overhaul mechanical equipment	4
MEM18005B	Perform fault diagnosis, installation and removal of bearings	4
MEM18006C	Repair and fit engineering components	6
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	4
MEM18008B	Balance equipment	2
MEM18009B	Perform levelling and alignment of machines and engineering components	4
MEM18010C	Perform equipment condition monitoring and recording	4
MEM18011C	Shut down and isolate machines/equipment	2
MEM18012B	Perform installation and removal of mechanical seals	2
MEM18013B	Perform gland packing	2
MEM18014B	Manufacture press tools and gauges	8
MEM18015B	Maintain tools and dies	4

Unit code	Unit title	P
MEM18018C	Maintain pneumatic system components	4
MEM18019B	Maintain pneumatic systems	4
MEM18020B	Maintain hydraulic system components	4
MEM18021B	Maintain hydraulic systems	4
MEM18022B	Maintain fluid power controls	8
MEM18024B	Maintain engine cooling systems	2
MEM18025B	Service combustion engines	2
MEM18026C	Test compression ignition fuel systems	4
MEM18027C	Overhaul engine fuel system components	8
MEM18028B	Maintain engine lubrication systems	2
MEM18029B	Tune diesel engines	4
MEM18030B	Diagnose and rectify low voltage electrical systems	8
MEM18031B	Diagnose and rectify low voltage starting systems	2
MEM18032B	Maintain induction/exhaust systems	4
MEM18033B	Perform engine bottom-end overhaul	4
MEM18034B	Perform engine top-end overhaul	8
MEM18035B	Diagnose and rectify braking systems	6
MEM18037B	Diagnose and rectify low voltage charging systems	2
MEM18038B	Maintain wheels and tyres	2
MEM18039B	Diagnose and rectify track type undercarriage	4
MEM18040B	Maintain suspension systems	4
MEM18041B	Maintain steering systems	4
MEM18042C	Diagnose and rectify manual transmissions	4
MEM18043C	Diagnose and rectify automatic transmissions	8

Unit code	Unit title	P
MEM18044C	Diagnose and rectify drive line and final drives	4
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	4
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	4
MEM18048B	Fault find and repair/rectify basic electrical circuits	12
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3
MEM18050C	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.	3
MEM18051B	Fault find and repair/rectify complex electrical circuits	6
MEM18052B	Maintain fluid power systems for mobile plant	4
MEM18054B	Fault find, test and calibrate instrumentation systems and equipment	8
MEM18055B	Dismantle, replace and assemble engineering components	3
MEM18056B	Diagnose and repair analog equipment and components	10
MEM18057B	Maintain/service analog/digital electronic equipment	6
MEM18058C	Modify electronic equipment	4
MEM18060B	Maintain, repair control instrumentation – single and multiple loop control systems	8
MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements	8
MEM18063B	Terminate signal and data cables	4
MEM18064B	Maintain instrumentation system components	6
MEM18065B	Diagnose and repair digital equipment and components	10
MEM18066B	Diagnose and repair microprocessor-based equipment	6

Unit code	Unit title	P
MEM18067B	Tune control loops – multi controller or multi element systems	6
MEM18071B	Connect/disconnect fluid conveying system components	2
MEM18072B	Manufacture fluid conveying conductor assemblies	4
MEM18084A	Commission and decommission split air conditioning systems	4
MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances	6
MEM18086B	Test, recover, evacuate and charge refrigeration systems	4
MEM18087B	Service and repair domestic and light commercial refrigeration and air conditioning equipment	6
MEM18088B	Maintain and repair commercial air conditioning systems and components	4
MEM18089B	Maintain and repair central air handling systems	6
MEM18090B	Maintain and repair industrial refrigeration systems and components	6
MEM18091B	Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems	4
MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls	6
MEM18094B	Service and repair commercial refrigeration	6
MEM18095A	Maintain and repair cooling towers/evaporative condensers and associated equipment	4
MEM18096A	Maintain, repair/replace and adjust refrigerant flow controls and associated equipment	6
MEM18097A	Manufacture cavity dies	8
MEM18098A	Prepare to perform work associated with fuel system installation and servicing	2
MEM19001B	Perform jewellery metal casting	6
MEM19002B	Prepare jewellery illustrations	4

Unit code	Unit title	P
MEM19003B	Handle gem materials	2
MEM19004B	Handle and examine gemstone materials	6
MEM19005B	Produce three-dimensional precision items	8
MEM19006B	Replace watch batteries	1
MEM19007B	Perform gemstone setting	6
MEM19008B	Prepare jewellery designs	6
MEM19009B	Perform investment procedures for lost wax casting process	1
MEM19010B	Produce rubber moulds for lost wax casting process	2
MEM19011B	Perform wax injection of moulds for lost wax casting process	2
MEM19012B	Produce jewellery wax model	4
MEM19013B	Produce jewellery metal masters	4
MEM19014B	Perform hand engraving	4
MEM19015B	Perform jewellery enamelling	4
MEM19016B	Construct jewellery components	4
MEM19017B	Fabricate jewellery items	6
MEM19018B	Repair jewellery items	6
MEM19020B	Fault-find and maintain micro-mechanisms	4
MEM19021B	Diagnose and service micro-mechanisms	6
MEM19022B	Perform precision micro-mechanism diagnosis and servicing	6
MEM20001A	Produce Keys	4
MEM20002A	Assemble and test lock mechanisms	6
MEM20003A	Install and upgrade locks and hardware	4
MEM20004A	Gain entry	4
MEM20005A	Install and maintain door control devices/systems	2

Unit code	Unit title	P
MEM20006A	Maintain and service mechanical locking devices	6
MEM20007A	Plan and prepare a masterkey system	4
MEM20008A	Develop and implement a masterkey system	6
MEM20009A	Gain entry and reinstate fire and security containers	4
MEM20010A	Gain entry and reinstate automotive locking systems	4
MEM20011A	Service and repair fire and security containers	6
MEM20012A	Service and repair mechanical automotive locking systems	4
MEM20013A	Service automotive transponder systems	2
MEM20014A	Perform a site security survey	2
MEM21001A	Replace watch batteries, capacitors and bands	2
MEM21002A	Perform watch movement exchange	2
MEM21003A	Perform watch case servicing, repair and refurbishment	4
MEM21004A	Clean watch and clock components	2
MEM21005A	Diagnose faults in quartz watches	2
MEM21006A	Service quartz watches	4
MEM21007A	Service complex quartz watches	4
MEM21008A	Service mechanical watches	4
MEM21009A	Inspect, diagnose, adjust and repair mechanical watches	4
MEM21010A	Service watch power generating systems	2
MEM21011A	Service calendar and other dial indication mechanisms for watches	4
MEM21012A	Service and repair mechanical watch oscillating systems	4
MEM21013A	Service, test and adjust watch escapements	4
MEM21014A	Service mechanical chronograph watches	6

Unit code	Unit title	P
MEM21015A	Perform precision watch timing and adjustment	6
MEM21016A	Install and set up clocks	2
MEM21017A	Service and repair clock timepieces	6
MEM21018A	Service clock escapements and oscillating systems	4
MEM21019A	Service and repair clock striking mechanisms	4
MEM21020A	Service and repair clock chiming mechanisms	6
MEM21021A	Restore clockwork mechanisms	6
MEM21022A	Manufacture watch and clock components	6
MEM21023A	Plan, set up and operate horological workshop or service centre	4
MEM24001B	Perform basic penetrant testing	2
MEM24002B	Perform penetrant testing	4
MEM24003B	Perform basic magnetic particle testing	2
MEM24004B	Perform magnetic particle testing	4
MEM24005B	Perform basic eddy current testing	2
MEM24006B	Perform eddy current testing	6
MEM24007B	Perform ultrasonic thickness testing	2
MEM24008B	Perform ultrasonic testing	6
MEM24009B	Perform basic radiographic testing	2
MEM24010B	Perform radiographic testing	6
MEM24012C	Apply metallurgy principles	4
MEM25001B	Apply fibre-reinforced materials	2
MEM25002B	Form and integrate fibre-reinforced structures	4
MEM25003B	Set up marine vessel structures	4
MEM25004B	Fair and shape surfaces	2

Unit code	Unit title	P
MEM25005B	Construct and assemble marine vessel timber components	8
MEM25006B	Undertake marine sheathing operations	2
MEM25007B	Maintain marine vessel surfaces	4
MEM25008B	Repair marine vessel surfaces and structures	4
MEM25009B	Form timber shapes using hot processes	2
MEM25010B	Perform fitout procedures	4
MEM25011B	Install marine systems	8
MEM25012B	Install and test operations of marine auxiliary systems	6
MEM25013B	Produce three-dimensional plugs/moulds	12
MEM25014B	Perform marine slipping operations	2
MEM25015A	Assemble and install equipment and accessories/ancillaries	2
MEM26001A	Lay up composites using open moulding techniques	0
MEM26002A	Lay up composites using vacuum closed moulding techniques	0
MEM26003A	Lay up composites using pressure closed moulding techniques	0
MEM26004A	Make basic plugs for composites fabrication	0
MEM26005A	Make basic moulds for composites fabrication	0
MEM26006A	Mark and cut out sheets for composite use	0
MEM26007A	Select and use reinforcing appropriate for product	0
MEM26008A	Select and use resin systems appropriate for product	0
MEM26009A	Select and use cores and filleres appropriate for product	0
MEM26010A	Store and handle composite materials	0
MEM26011A	Determine materials and techniques for a composite component or product*	0
MEM26012A	Record and trial work processes for one-off composite products	0

Unit code	Unit title	P
MEM26013A	Select and use composite processes or systems appropriate for product	0
MEM26014A	Adjust resin chemicals for current conditions	0
MEM26015A	Select and apply repair techniques	0
MEM26016A	Select and use joining techniques	0
MEM26017A	Prepare composite or other substrate surfaces	0
MEM26018A	Organise composite trials	0
MEM26019A	Finish a composite product	0
MEM26020A	Identify and interpret required standards for composites	0
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	4
MEM50002B	Work safely on marine craft	1
MEM50003B	Follow work procedures to maintain the marine environment	1
MEM50004B	Maintain quality of environment by following marina codes	1
MEM50009B	Safely operate a mechanically powered recreational boat	2
AURV225908A	Carry out panel repairs	4
ICTTC136B	Install, maintain and modify customer premises communications cabling: ACA Restricted Rule	6
ICTTC137B	Install, maintain and modify customer premises communications cabling: ACA Open Rule	6
MSAENV472B	Implement and monitor environmentally sustainable work practices	4
MSATCM304A	Interpret basic binary phase diagrams	4
PMBPROD291B	Operate resin infusion moulding equipment	2
PMBPROD294B	Operate resin transfer moulding equipment	2
PMBPROD298B	Operate equipment using pre-pregs material	2

Unit code	Unit title	P
PMBPROD391B	Produce composites using resin infusion	4
PMBPROD394B	Produce composites using resin transfer moulding	4
PMBPROD398B	Produce composites using pre-pregs	4
PRSTS202A	Install security equipment/system	4
PRSTS302A	Program security equipment/system	2
PRSTS303A	Test installed security equipment/system	2
PRSTS304A	Commission/decommission security equipment/system	2
PRSTS305A	Identify and diagnose electronic security equipment/ system fault	2
PRSTS307A	Maintain and service security equipment/system	4
PRSTS317A	Provide estimate and quote	4
PRSTS319A	Modify and repair security equipment/system	4
TLILIC2001A	Licence to operate a forklift truck	0
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)	1

Appendix 2: Imported units of competency and points weighting

The table below shows imported units of competency and, where applicable, their allocated points weighting. Unit points weightings are shown in the right hand column labelled "P".

Training Package codes for imported units:

AUR05	Automotive Industry Retail, Service and Repair Training Package
BSB01	Business Services Training Package
CPC08	Construction, Plumbing and Services Integrated Framework
CUF07	Screen and Media Training Package
CUV11	Visual Arts, Craft and Design Training Package

ICT02	Telecommunications Training Package
LMF02	Furnishing Training Package
MEA11	Aeroskills Training Package
MSA07	Manufacturing Training Package
MSL09	Laboratory Training Package
PMB07	Plastics, Rubber and Cablemaking Training Package
PRS03	Asset Security Training Package
SIR07	Retail Services Training Package
TLI10	Transport and Logistics Training Package
UEP06	Electricity Supply Industry Training Package

Unit code	Unit title	P
AURV225908A	Carry out panel repairs	4
BSBCMM401A	Make a presentation	
BSBCRT401A	Articulate, present and debate ideas	
BSBCRT402A	Collaborate in a creative process	
BSBCRT501A	Originate and develop concepts	
BSBCRT601A	Research and apply concepts and theories of creativity	
BSBDES402A	Interpret and respond to a design brief	
BSBDES502A	Establish, negotiate and refine a design brief	
BSBDES601A	Manage design realisation	
BSBDES602A	Research global design trends	
BSBDES701A	Research and apply design theory	
BSBIPR401A	Use and respect copyright	
BSBIPR501A	Manage intellectual property to protect and grow business	

BSBLED705A	Plan and implement a mentoring program	
BSBLED706A	Plan and implement a coaching strategy	
BSBLED710A	Develop human capital	
BSBPMG510A	Manage projects	
BSBREL701A	Develop and cultivate collaborative partnerships and relationships	
BSBSMB403A	Market the small business	4
BSBSMB405A	Monitor and manage small business operations	4
BSBSMB406A	Manage small business finances	4
CPCCLDG3001A	Licence to perform dogging	
CPCCLRG3001A	Licence to perform rigging basic level	
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	
CPCCOHS1001A	Work safely in the construction industry	
CPCPCM4002A	Estimate and cost work	
CPPBDN5013A	Develop and collaborate on building information models for small-scale building design projects	
CUFIND201A	Develop and apply creative arts industry knowledge	
CUFRES401A	Conduct research	
CUVACD304A	Make scale models	
CUVACD504A	Research and apply light and colour	
CUVACD506A	Refine 2-D design ideas and processes	
CUVACD507A	Refine 3-D design ideas and processes	
CUVACD512A	Work with photomedia in creative practice	
CUVACD601A	Extend professional expertise with drawing and other visual representation tools	

CUVDES403A	Research and apply techniques for the design of wearable objects	
CUVDIG401A	Experiment with techniques to enhance digital images	
CUVDIG501A	Refine digital art techniques	
CUVDRA501A	Refine drawing techniques	
CUVDRA502A	Investigate drawing materials and processes	
CUVGRD301A	Prepare files for publication	
CUVJWL401A	Experiment with techniques to produce jewellery	
CUVPHI302A	Capture photographic images	
CUVPHI403A	Apply photo imaging lighting techniques	
CUVPRP403A	Select and organise finished work for storage	
CUVPRP405A	Develop and discuss ideas for own creative work	
CUVPRP501A	Realise a body of creative work	
CUVPRP502A	Prepare for sustainable professional practice	
CUVPRP503A	Present a body of own creative work	
CUVPRP601A	Originate a body of independent creative work	
CUVPRP602A	Collaborate in professional creative projects	
CUVPRP603A	Engage in the business of creative practice	
CUVPRP604A	Publicly present a body of own creative work	
CUVRES502A	Analyse cultural history and theory	
CUVRES601A	Extend cultural research expertise	
FDFOP2005A	Work in a socially diverse environment	
LMFFDT4012A	Produce ideation drawings	
LMTGN4002A	Participate in product engineering	
ICTTC136B	Install, maintain and modify customer premises communications cabling: ACA Restricted Rule	6

ICTTC137B	Install, maintain and modify customer premises communications cabling: ACA Open Rule	6
LMTGN4002A	Participate in product engineering	
MEA101B	Interpret occupational health and safety practices in aviation maintenance	
MEA105C	Apply quality standards applicable to aviation maintenance processes	
MEA107B	Interpret and use aviation maintenance industry manuals and specifications	
MEA108B	Complete aviation maintenance industry documentation	
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance	
MEA270A	Lay out avionic systems	
MEA271A	Lay out avionic flight management systems	
MEA272B	Apply basic scientific principles and techniques in avionic engineering situations	
MEA273A	Select and test avionic engineering materials	
MEA340A	Lay out and set up aircraft systems	
MEA341A	Apply basic aircraft design characteristics	
MEA342A	Apply basic aircraft power plant design characteristics	
MEA349B	Apply basic scientific principles and techniques in aeronautical engineering situations	
MEA350A	Select and test aeronautical engineering materials	
MSS402002A	Sustain process improvements	
MSS402030A	Apply cost factors to work practices	
MSS402051A	Apply quality standards	
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	
MSS403023A	Monitor a levelled pull system of operations	
MSS403030A	Improve cost factors in work practices	
MSS403032A	Analyse manual handling processes	
MSS403040A	Facilitate and improve implementation of 5S	
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	
MSS405005A	Manage competitive systems and practices in an organisation responding to individual and unique customer orders	
MSS405007A	Introduce competitive systems and practices to a small or medium enterprise	

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 a product or process costs in terms of customer requirements	
MSS405032A	Analyse cost implications of maintenance strategy	
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	
MSS407001A	Prepare for and implement change	
MSS407002A	Review operations practice tools and techniques	
MSS407003A	Analyse process changes	
MSS407004A	Facilitate improvements in the internal value stream	
MSS407005A	Undertake a qualitative review of a process change	

MSS407006A	Build relationships between teams in an operations environment	
MSS407007A	Respond to a major non-conformance	
MSS407008A	Capture learning from daily activities in a organisation	
MSS407009A	Facilitate improvements in the external value stream	
MSS407010A	Improve visual management in the workplace	
MSS407011A	Manage benchmarking studies	
MSS407012A	Lead a problem solving process to determine and solve root cause	
MSS407013A	Review continuous improvement processes	
MSS408001A	Develop the competitive systems and practices approach	
MSS408002A	Audit the use of competitive tools	
MSS408003A	Develop models of future state operations practice	
MSS408004A	Develop the value stream	
MSS408005A	Develop the learning processes of the operations organisation	
MSS408006A	Develop and refine systems for continuous improvement in operations	
MSS408007A	Develop problem solving capability of a organisation	
MSS408008A	Analyse data for relevance to organisational learning	
MSAENV272B	Participate in environmentally sustainable work practices	3
MSAENV472B	Implement and monitor environmentally sustainable work practices	4
MSAENV672B	Develop workplace policy and procedures for environmental sustainability	
MSATCM304A	Interpret basic binary phase diagrams	4
MSATCS301A	Interpret architectural and 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	
MSATCS504A	Detail ancillary steelwork	
MSL976003A	Evaluate and select appropriate test methods and procedures	
PMBPROD291B	Operate resin infusion moulding equipment	2
PMBPROD294B	Operate resin transfer moulding equipment	2
PMBPROD298B	Operate equipment using pre-pregs material	2
PMBPROD391B	Produce composites using resin infusion	4
PMBPROD394B	Produce composites using resin transfer moulding	4
PMBPROD398B	Produce composites using pre-pregs	4
PRSTS202A	Install security equipment/system	4
PRSTS302A	Program security equipment/system	2
PRSTS303A	Test installed security equipment/system	2
PRSTS304A	Commission/decommission security equipment/system	2
PRSTS305A	Identify and diagnose electronic security equipment/ system fault	2
PRSTS307A	Maintain and service security equipment/system	4
PRSTS317A	Provide estimate and quote	4
PRSTS319A	Modify and repair security equipment/system	4
SIRXSL001A	Sell products and services	
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)	1
TLILIC2001A	Licence to operate a forklift truck	
TLILIC2002A	Licence to operate an order picking forklift truck	

TLILIC3003A	Licence to operate a bridge and gantry crane	
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than 3 tonnes capacity)	
UEPMNT419A	Perform Civil Drafting	