Australian Government

MSS11 Sustainability Training Package

Release: 1.0

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MSS11 Sustainability Training Package

Modification History

The version details of this endorsed Training Package are in the table below.

Version	Release Date	Comments
1	June 2011	Initial release

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IMPRINT PAGE

MSS11 Sustainability Training Package

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PO BOX 289

North Sydney, 2060, NSW

ABN:

Phone: (02) 9955 5500

Fax: (02) 9955 8044

Email: info@mskills.com.au

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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 1 – check whether this is the latest version by going to the National Training Information Service (*www.ntis.gov.au*) and locating information about the Training Package. Alternatively, contact Manufacturing Skills Australia (see Manufacturing Skills Australia - http://www.ISC.net.au/, see Manufacturing Skills Australia - 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 Package's national code (which remains the same during its period of endorsement).

Explanation of the review date

The review date (shown on the title page and in the footer 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.

Version modification history

The version details of this endorsed Training Package are in the table below. The latest information is at the top of the table.

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Version	Release Date	Comments
1	June 2011	Initial Release

Summary of AQF qualifications in MSS11 Sustainability Training Package

Code	Title
MSS40111	Certificate IV in Sustainable Operations
MSS40211	Certificate IV in Environmental Monitoring and Technology
MSS50111	Diploma of Sustainable Operations
MSS50211	Diploma of Environmental Monitoring and Technology
MSS70111	Vocational Graduate Certificate in Sustainable Operations
MSS70211	Vocational Graduate Certificate in Environmental Management

Summary of Units of Competency in MSS11 Sustainability Training Package and their Pre-Requisite Requirements

Unit code	Unit title	Prerequisite
MSS014001A	Improve sustainability through readily implementable change	
MSS014002A	Evaluate sustainability impact of a work or process area	
MSS014003A	Optimise sustainability of a process or plant area	
MSS014004A	Develop team strategies for more sustainable use of resources	
MSS014005A	Apply proactive maintenance strategies to sustainability	
MSS014006A	Contribute to sustainability related audits	
MSS015001A	Measure and report carbon footprint	
MSS015002A	Develop strategies for more sustainable use of resources	

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Unit code	Unit title	Prerequisite
MSS015003A	Analyse product life cycle for sustainability	
MSS015004A	Design sustainable product or process	
MSS015005A	Develop required sustainability reports	
MSS015006A	Report to Global Reporting Initiative guidelines	
MSS015007A	Develop a business case for sustainability improvements	
MSS015008A	Develop strategic sustainability plans	
MSS015009A	Implement sustainability plans	
MSS015010A	Conduct a sustainability water use audit	
MSS015011A	Conduct a sustainability energy audit	
MSS015012A	Conduct an emissions audit	
MSS015013A	Conduct a sustainability related transport audit	
MSS015014A	Develop response to sustainability related regulation	
MSS015015A	Evaluate sustainability impact of a process	
MSS015016A	Implement and monitor reengineering for sustainability	
MSS015017A	Develop regulated sustainability reports	
MSS015018A	Inform and advise organisation and community representatives on sustainability issues	
MSS017001A	Analyse and determine organisational risk areas in sustainability	
MSS017002A	Determine process loss through mass or energy balancing	
MSS017003A	Identify and respond to external sustainability factors for an organisation	
MSS017004A	Lead sustainable strategy deployment	

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Unit code	Unit title	Prerequisite
MSS017005A	Manage a major sustainability non-conformance	
MSS017006A	Identify and improve sustainability interactions relations with the community	
MSS017007A	Design for sustainability	
MSS024001A	Work and communicate effectively as an environmental technician	
MSS024002A	Implement environmental management plans and procedures	
MSS024003A	Apply an understanding of environmental principles to a site	
MSS024004A	Process and present environmental data	
MSS024005A	Collect spatial and discrete environmental data	
MSS024006A	Perform sampling and testing of water	
MSS024007A	Collect and evaluate meteorological data	
MSS024008A	Recognise common geological landforms and samples	
MSS024009A	Assist with assessing and monitoring stormwater systems	
MSS024010A	Perform environmental biological techniques	
MSS024011A	Navigate in urban, regional and remote areas	
MSS024012A	Undertake simple environmental project activities	
MSS025001A	Assist with assessing site environmental indicators	MSS024003A
MSS025002A	Assess the environmental risk or impact of a project activity or process	MSS024003A
MSS025003A	Report environmental data	MSS024004A
MSS025004A	Provide environmental information to customers	

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Unit code	Unit title	Prerequisite
MSS025005A	Produce site maps	MSS024005A
MSS025006A	Collect and evaluate groundwater data	
MSS025007A	Perform sampling and testing of soils	MSS024008A
MSS025008A	Monitor and evaluate noise	
MSS025009A	Perform sampling and testing of air	
MSS025010A	Assist with odour source assessment	
MSS025011A	Assist with odour field assessment	
MSS025012A	Perform environmental microbiological tests	MSS024010A
MSS025013A	Assist with assessing and monitoring wetlands	
MSS025014A	Perform sampling and testing of contaminated sites	MSS024008A
MSS025015A	Plan and conduct environmental project work	
MSS025016A	Perform sampling and testing of stationary emissions	
MSS027001A	Coordinate environmental management activities	
MSS027002A	Apply environmental legislation, codes and standards	
MSS027003A	Provide environmental advice to clients	
MSS027004A	Contribute to environmental decision making	
MSS027005A	Contribute to improving environmental performance	
MSS027006A	Coordinate water quality management activities	MSS024006A
MSS027007A	Coordinate air quality management activities	MSS025009A OR MSS025016A
MSS027008A	Coordinate noise management activities	MSS025008A

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Unit code	Unit title	Prerequisite
MSS027009A	Coordinate site remediation or rehabilitation activities	Path 1 MSS025006A, MSS025007A, MSS024008A Path 2 MSS025006A, MSS025007A, MSS025013A
MSS027010A	Undertake complex environmental project work	
MSS027011A	Select, commission and maintain environmental monitoring instruments	
MSS027012A	Implement and monitor the site OHS management system	MSL944001A

Imported Units of Competency in MSS11 Sustainability Training Package

Code	Title	Pre-requisite	Origin
BSBOHS406C	Use equipment to conduct workplace monitoring		BSB07
BSBOHS605B	Apply occupational hygiene principles to control OHS risk		BSB07
BSBRSK401A	Identify risk and apply risk management processes		BSB07
CUVPHI05B	Use a 35mm SLR camera or digital equivalent		CUV03
HLTFA301B	Apply first aid		HLT07
LGAPLEM506A	Improve community knowledge and skills in environmental management practices		LGA04
LMFFDT4003A	Assess and record the lifecycle of a product		LMF02
LMFFT4007B	Sample, inspect and test products to specifications		LMF02

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LMTGN4002A	Participate in product engineering		LMT07
LMTGN4016A	Contribute to the development of products or processes		LMT07
MEM13002B	Undertake occupational health and safety activities in the workplace		MEM05
MEM30016A	Assist in the analysis of a supply chain		MEM05
MSACMC410A	Lead change in a manufacturing environment		MEM05
MSACMC411A	Lead a competitive manufacturing team		MSA07
MSACMC413A	Lead team culture improvement		MSA07
MSACMC610A	Manage relationships with non-customer external organisations		MSA07
MSACMC611A	Manage people relationships		MSA07
MSACMC612A	Manage workplace learning		MSA07
MSACMC613A	Facilitate holistic culture improvement in a manufacturing enterprise		MSA07
MSACMC614A	Develop a communications strategy to support production		MSA07
MSACMG700A	Review continuous improvement processes		MSA07
MSACMG701A	Prepare for and implement change		MSA07
MSACMG702A	Review manufacturing practice tools and techniques		MSA07
MSACMG703A	Analyse process changes		MSA07
MSACMG704A	Facilitate improvements in the value chain		MSA07
MSACMG705A	Undertake a qualitative review of a process change		MSA07
MSACMG706A	Build relationships between teams in a manufacturing environment		MSA07
MSACMG708A	Capture learning from daily activities in a manufacturing organisation		MSA07

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MSACMG709A	Facilitate improvements in the external value chain		MSA07
MSACMG710A	Improve visual management in the workplace		MSA07
MSACMG711A	Manage benchmarking studies		MSA07
MSACMG712A	Lead a problem solving process to determine and solve root cause		MSA07
MSACMG800A	Analyse data for relevance to organisational learning		MSA07
MSACMG801A	Develop the competitive manufacturing approach		MSA07
MSACMG802A	Audit the use of competitive tools		MSA07
MSACMS400A	Implement a competitive manufacturing system		MSA07
MSACMS401A	Ensure process improvements are sustained		MSA07
MSACMS405A	Lead a manufacturing team using a balanced score card approach		MSA07
MSACMS600A	Develop a competitive manufacturing system		MSA07
MSACMS601A	Analyse and map a value chain	MSACMT631A MSACMT230A	MSA07
MSACMS602A	Manage a value chain	MSACMS601A MSACMT631A MSACMT230A	MSA07
MSACMS603A	Develop manufacturing related business plans		MSA07
MSACMT230A	Apply cost factors to work practices		MSA07
MSACMT260A	Use planning software systems in manufacturing		MSA07
MSACMT261A	Use SCADA systems in manufacturing		MSA07
MSACMT280A	Undertake root cause analysis		MSA07

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MSACMT423A	Monitor a manufacturing levelled pull system		MSA07
MSACMT430A	Improve cost factors in work practices		MSA07
MSACMT440A	Lead 5S in a manufacturing environment		MSA07
MSACMT441A	Facilitate continuous improvement in manufacturing		MSA07
MSACMT450A	Undertake process capability improvements	MSACMT452A	MSA07
MSACMT451A	Mistake proof a production process		MSA07
MSACMT452A	Apply statistics to processes in manufacturing		MSA07
MSACMT453A	Use six sigma techniques	MSACMT452A	MSA07
MSACMT460A	Facilitate the use of planning software systems in manufacturing	MSACMT260A	MSA07
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area	MSACMT261A	MSA07
MSACMT481A	Undertake proactive maintenance analyses		MSA07
MSACMT482A	Assist in implementing a proactive maintenance strategy		MSA07
MSACMT483A	Support proactive maintenance		MSA07
MSACMT620A	Develop quick changeover procedures		MSA07
MSACMT621A	Develop a Just in Time (JIT) system	MSACMC410A	MSA07
MSACMT631A	Undertake value analysis of product costs in terms of customer requirements	MSACMT230A	MSA07
MSACMT632A	Analyse cost implications of maintenance strategy		MSA07
MSACMT640A	Manage 5S system in a manufacturing environment		MSA07
MSACMT641A	Implement a continuous improvement system		MSA07
MSACMT650A	Determine and improve process capability	MSACMT452A	MSA07
MSACMT660A	Develop the application of enterprise systems		MSA07

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	in manufacturing		
MSACMT661A	Determine and establish information collection requirements and processes		MSA07
MSACMT662A	Develop a documentation control strategy for a manufacturing enterprise		MSA07
MSACMT670A	Develop and manage sustainable energy practices		MSA07
MSACMT671A	Develop and manage sustainable environmental practices		MSA07
MSACMT675A	Facilitate the development of a new product	MSACMT452A	MSA07
MSACMT681A	Develop a proactive maintenance strategy		MSA07
MSAENV272B	Participate in environmentally sustainable work practices		MSA07
MSAENV472B	Implement and monitor environmentally sustainable work practices		MSA07
MSAENV672B	Develop workplace policy and procedures for sustainability		MSA07
MSAPMOHS401A	Assess risk		MSA07
MSAPMOHS510A	Manage risk		MSA07
MSAPMSUP301A	Apply HACCP to the workplace		MSA07
MSAPMSUP390A	Use structured problem solving tools		MSA07
MSL904001A	Perform standard calibrations		MSL09
MSL924002A	Use laboratory application software		MSL09
MSL933003A	Apply critical control point requirements		MSL09
MSL934001A	Contribute to the ongoing development of HACCP plans		MSL09
MSL935004A	Maintain instruments and equipment		MSL09
MSL943002A	Participate in laboratory/field workplace safety		MSL09

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MSL944001A	Maintain laboratory/field workplace safety		MSL09
MSL952001A	Collect routine site samples		MSL09
MSL954001A	Obtain representative samples in accordance with sampling plan		MSL09
MSL973001A	Perform basic tests		MSL09
MSL973002A	Prepare working solutions		MSL09
MSL973004A	Perform asceptic techniques		MSL09
MSL973007A	Perform microscopic examination		MSL09
MSL973012A	Assist with geotechnical site investigations		MSL09
MSL974002A	Conduct geotechnical site investigations	MSL973012A	MSL09
MSL974003A	Perform chemical tests and procedures		MSL09
MSL974006A	Perform biological procedures	MSL973004A MSL973007A	MSL09
MSL974007A	Undertake environmental field-based monitoring		MSL09
MSL974009A	Undertake field-based, remote-sensing monitoring		MSL09
MSL975011A	Design and supervise complex environmental field surveys	MSL974007A	MSL09
MSL975017A	Perform laboratory-based ecological techniques	MSL974006A MSL973004A MSL973007A	MSL09
MSL975023A	Supervise geotechnical site investigations	MSL974002A MSL973012A	MSL09
PMASUP520B	Review procedures to minimise environmental impact of process		PMA08
PMASUP540B	Analyse equipment performance		PMA08
PMASUP620B	Manage environmental management system		PMA08

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PRMWM01B	Plan waste audit		PRM04
PRMWM02B	Carry out waste audit		PRM04
PSPRAD703A	Perform basic radiation measurements		PSP04
PSPRAD707A	Monitor radiation		PSP04
PUAWER009B	Participate as a member of a workplace emergency initial response team		TBA
PUAWER010B	Lead a workplace emergency initial response team		TBA
RIINHB408A	Supervise environmental drilling operations		RII09
RIIPRM501A	Implement, monitor, rectify and report on contracts		RII09
TAEDEL301A	Provide work skill instruction		TAE10

Mapping of MSS11 units of competency to MSS11 qualifications

Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSS014001A	Improve sustainability through readily implementable change	X	X				
MSS014002A	Evaluate sustainability impact of a work or process area	X					
MSS014003A	Optimise sustainability of a process or plant area	X					
MSS014004A	Develop team strategies for more sustainable use of resources	X					
MSS014005A	Apply proactive maintenance strategies to sustainability	X					
MSS014006A	Contribute to sustainability related audits	X			X	X	

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSS015001A	Measure and report carbon footprint		X		X	X	
MSS015002A	Develop strategies for more sustainable use of resources		X				
MSS015003A	Analyse product life cycle for sustainability		X				
MSS015004A	Design sustainable product or process		X				
MSS015005A	Develop required sustainability reports	X	X				
MSS015006A	Report to Global Reporting Initiative guidelines		X				
MSS015007A	Develop a business case for sustainability improvements		X				
MSS015008A	Develop strategic sustainability plans		X				
MSS015009A	Implement sustainability plans		X				
MSS015010A	Conduct a sustainability water use audit		X		X	X	
MSS015011A	Conduct a sustainability energy audit		X		X	X	
MSS015012A	Conduct an emissions audit		X		X	X	
MSS015013A	Conduct a sustainability related transport audit		X				
MSS015014A	Develop response to sustainability related regulation		X				
MSS015015A	Evaluate sustainability impact of a process		X				
MSS015016A	Implement and monitor reengineering for		X				

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
	sustainability						
MSS015017A	Develop regulated sustainability reports		X				
MSS015018A	Inform and advise organisation and community representatives on sustainability issues		X		X	X	X
MSS017001A	Analyse and determine organisational risk areas in sustainability			X			
MSS017002A	Determine process loss through mass or energy balancing			X			
MSS017003A	Identify and respond to external sustainability factors for an organisation			X			
MSS017004A	Lead sustainable strategy deployment			X			
MSS017005A	Manage a major sustainability non-conformance			X			
MSS017006A	Identify and improve sustainability interactions relations with the community			X			
MSS017007A	Design for sustainability			X			
MSS024001A	Work and communicate effectively as an environmental technician				X	X	
MSS024002A	Implement environmental management plans and procedures	X			X	X	
MSS024003A	Apply an understanding of environmental principles to a site	X	X		X	X	

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSS024004A	Process and present environmental data				X	X	
MSS024005A	Collect spatial and discrete environmental data				X	X	X
MSS024006A	Perform sampling and testing of water				X	X	X
MSS024007A	Collect and evaluate meteorological data				X	X	X
MSS024008A	Recognise common geological landforms and samples				X	X	X
MSS024009A	Assist with assessing and monitoring stormwater systems				X	X	X
MSS024010A	Perform environmental biological techniques				X	X	
MSS024011A	Navigate in urban, regional and remote areas				X	X	
MSS024012A	Undertake simple environmental project activities				X	X	
MSS025001A	Assist with assessing site environmental indicators		X		X	X	
MSS025002A	Assess the environmental risk or impact of a project activity or process		X		X	X	
MSS025003A	Report environmental data				X	X	
MSS025004A	Provide environmental information to customers				X	X	
MSS025005A	Produce site maps				X	X	X
MSS025006A	Collect and evaluate groundwater data				X	X	X

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSS025007A	Perform sampling and testing of soils				X	X	X
MSS025008A	Monitor and evaluate noise				X	X	X
MSS025009A	Perform sampling and testing of air				X	X	X
MSS025010A	Assist with odour source assessment				X	X	X
MSS025011A	Assist with odour field assessment				X	X	X
MSS025012A	Perform environmental microbiological tests				X	X	
MSS025013A	Assist with assessing and monitoring wetlands				X	X	X
MSS025014A	Perform sampling and testing of contaminated sites				X	X	X
MSS025015A	Plan and conduct environmental project work				X	X	
MSS025016A	Perform sampling and testing of stationary emissions				X	X	X
MSS027001A	Coordinate environmental management activities						X
MSS027002A	Apply environmental legislation, codes and standards			X			X
MSS027003A	Provide environmental advice to clients						X
MSS027004A	Contribute to environmental decision making						X
MSS027005A	Contribute to improving environmental performance						X

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSS027006A	Coordinate water quality management activities						X
MSS027007A	Coordinate air quality management activities						X
MSS027008A	Coordinate noise management activities						X
MSS027009A	Coordinate site remediation or rehabilitation activities						X
MSS027010A	Undertake complex environmental project work						X
MSS027011A	Select, commission and maintain environmental monitoring instruments						X
MSS027012A	Implement and monitor the site OHS management system						X
Imported units							
BSBOHS406C	Use equipment to conduct workplace monitoring				X	X	
BSBOHS605B	Apply occupational hygiene principles to control OHS risk						X
BSBRSK401A	Identify risk and apply risk management processes	X					
CUVPHI05B	Use a 35mm SLR camera or digital equivalent				X	X	
HLTFA301B	Apply first aid				X	X	
LGAPLEM506A	Improve community knowledge and skills in environmental management practices						X
LMFFDT4003A	Assess and record the lifecycle of a product	X					

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
LMFFT4007B	Sample, inspect and test products to specifications	X					
LMTGN4002A	Participate in product engineering	X					
LMTGN4016A	Contribute to the development of products or processes	X					
MEM13002B	Undertake occupational health and safety activities in the workplace	X					
MEM30016A	Assist in the analysis of a supply chain	X					
MSACMC410A	Lead change in a manufacturing environment	X	X				
MSACMC411A	Lead a competitive manufacturing team	X					
MSACMC413A	Lead team culture improvement	X					
MSACMC610A	Manage relationships with non-customer external organisations		X				
MSACMC611A	Manage people relationships		X				
MSACMC612A	Manage workplace learning		X				
MSACMC613A	Facilitate holistic culture improvement in a manufacturing enterprise		X				
MSACMC614A	Develop a communications strategy to support production		X				
MSACMG700A	Review continuous improvement processes			X			

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSACMG701A	Prepare for and implement change			X			
MSACMG702A	Review manufacturing practice tools and techniques			X			
MSACMG703A	Analyse process changes			X			
MSACMG704A	Facilitate improvements in the value chain			X			
MSACMG705A	Undertake a qualitative review of a process change			X			
MSACMG706A	Build relationships between teams in a manufacturing environment			X			
MSACMG708A	Capture learning from daily activities in a manufacturing organisation			X			
MSACMG709A	Facilitate improvements in the external value chain			X			
MSACMG710A	Improve visual management in the workplace			X			
MSACMG711A	Manage benchmarking studies			X			
MSACMG712A	Lead a problem solving process to determine and solve root cause			X			
MSACMG800A	Analyse data for relevance to organisational learning			X			
MSACMG801A	Develop the competitive manufacturing approach			X			
MSACMG802A	Audit the use of competitive tools			X			
MSACMS400A	Implement a competitive	X	X				

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
	manufacturing system						
MSACMS401A	Ensure process improvements are sustained	X					
MSACMS405A	Lead a manufacturing team using a balanced score card approach	X					
MSACMS600A	Develop a competitive manufacturing system		X				
MSACMS601A	Analyse and map a value chain		X				
MSACMS602A	Manage a value chain		X				
MSACMS603A	Develop manufacturing related business plans		X				
MSACMT230A	Apply cost factors to work practices	X	X				
MSACMT260A	Use planning software systems in manufacturing	X	X				
MSACMT261A	Use SCADA systems in manufacturing	X	X				
MSACMT280A	Undertake root cause analysis	X	X				
MSACMT423A	Monitor a manufacturing levelled pull system	X	X				
MSACMT430A	Improve cost factors in work practices	X					
MSACMT440A	Lead 5S in a manufacturing environment	X					
MSACMT441A	Facilitate continuous improvement in manufacturing	X					
MSACMT450A	Undertake process capability improvements	X					

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
MSACMT451A	Mistake proof a production process	X	X				
MSACMT452A	Apply statistics to processes in manufacturing	X	X				
MSACMT453A	Use six sigma techniques	X	X				
MSACMT460A	Facilitate the use of planning software systems in manufacturing	X	X				
MSACMT461A	Facilitate SCADA systems in a manufacturing team or work area	X					
MSACMT481A	Undertake proactive maintenance analyses	X	X				
MSACMT482A	Assist in implementing a proactive maintenance strategy	X					
MSACMT483A	Support proactive maintenance	X					
MSACMT620A	Develop quick changeover procedures		X				
MSACMT621A	Develop a Just in Time (JIT) system		X				
MSACMT631A	Undertake value analysis of product costs in terms of customer requirements		X				
MSACMT632A	Analyse cost implications of maintenance strategy		X				
MSACMT640A	Manage 5S system in a manufacturing environment		X				
MSACMT641A	Implement a continuous improvement system		X				
MSACMT650A	Determine and improve		X				

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
	process capability						
MSACMT660A	Develop the application of enterprise systems in manufacturing		X				
MSACMT661A	Determine and establish information collection requirements and processes		X				
MSACMT662A	Develop a documentation control strategy for a manufacturing enterprise		X				
MSACMT670A	Develop and manage sustainable energy practices		X				
MSACMT671A	Develop and manage sustainable environmental practices		X				
MSACMT675A	Facilitate the development of a new product		X				
MSACMT681A	Develop a proactive maintenance strategy		X				
MSAENV272B	Participate in environmentally sustainable work practices				X	X	
MSAENV472B	Implement and monitor environmentally sustainable work practices	X			X	X	X
MSAENV672B	Develop workplace policy and procedures for sustainability		X	X			X
MSAPMOHS401A	Assess risk	X					
MSAPMOHS510A	Manage risk		X				
MSAPMSUP301A	Apply HACCP to the workplace	X					
MSAPMSUP390A	Use structured problem	X	X				

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
	solving tools						
MSL904001A	Perform standard calibrations				X	X	
MSL924002A	Use laboratory application software				X	X	
MSL933003A	Apply critical control point requirements	X					
MSL934001A	Contribute to the ongoing development of HACCP plans	X					
MSL935004A	Maintain instruments and equipment				X	X	
MSL943002A	Participate in laboratory/field workplace safety				X	X	
MSL944001A	Maintain laboratory/field workplace safety						X
MSL952001A	Collect routine site samples				X	X	
MSL954001A	Obtain representative samples in accordance with sampling plan				X	X	
MSL973001A	Perform basic tests				X	X	
MSL973002A	Prepare working solutions				X	X	
MSL973004A	Perform asceptic techniques				X	X	
MSL973007A	Perform microscopic examination				X	X	
MSL973012A	Assist with geotechnical site investigations					X	
MSL974002A	Conduct geotechnical site investigations					X	
MSL974003A	Perform chemical tests and				X	X	

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
	procedures						
MSL974006A	Perform biological procedures				X	X	
MSL974007A	Undertake environmental field-based monitoring	X			X	X	X
MSL974009A	Undertake field-based, remote-sensing monitoring	X			X	X	X
MSL975011A	Design and supervise complex environmental field surveys				X	X	X
MSL975017A	Perform laboratory-based ecological techniques				X	X	
MSL975023A	Supervise geotechnical site investigations				X	X	
PMASUP520B	Review procedures to minimise environmental impact of process	X	X				
PMASUP540B	Analyse equipment performance	X	X				
PMASUP620B	Manage environmental management system		X				
PRMWM01B	Plan waste audit				X	X	
PRMWM02B	Carry out waste audit				X	X	
PSPRAD703A	Perform basic radiation measurements				X	X	
PSPRAD707A	Monitor radiation				X	X	X
PUAWER009B	Participate as a member of a workplace emergency initial response team				X	X	
PUAWER010B	Lead a workplace emergency initial response team						X

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Unit code	Unit title	40111	50111	70111	40211	50211	70211
RIINHB408A	Supervise environmental drilling operations						X
RIIPRM501A	Implement, monitor, rectify and report on contracts						X
TAEDEL301A	Provide work skill instruction				X	X	

Overview

What is a Training Package?

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

Each Training Package:

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

How do Training Packages fit within the National Skills Framework?

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

How are Training Packages developed?

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

How do Training Packages encourage flexibility?

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

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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?

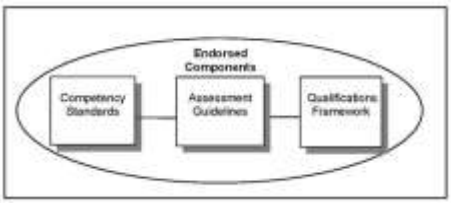
Training and assessment using Training Packages must be conducted by a Registered Training Organisation (RTO) that has the qualifications or specific units of competency on its scope of registration, or that works in partnership with another RTO, as specified in the AQTF 2010.

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.

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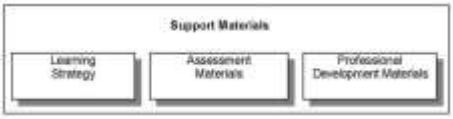
Training Package Support Materials

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 XYZ08. The first three characters are letters identifying the Training Package industry coverage and the last two characters are numbers identifying the year of endorsement.

Qualification Codes

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

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

Unit of Competency Codes

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

- a typical code is made up of 12 characters, normally a mixture of uppercase letters and numbers, as in MSS015003A

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- the first three characters signify the Training Package – MSS11 Sustainability Training Package – 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: MSS50111 Certificate IV in Sustainable Operations

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: MSSS015003A Analyse product life cycle for sustainability

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Introduction to the MSS11 Sustainability Training Package

Background to development of MSS11 Sustainability Training Package

Sustainability is a strategic priority for MSA

Since its inception as an Industry Skills Council (ISC) in 2004, productivity, sustainability and strategic workforce development have been the key pillars that support Manufacturing Skills Australia's (MSA's) vision.

MSA's strategic actions focus on achieving business improvements. MSA's flagship, the competitive manufacturing units of competency and qualifications, have been critical components of this focus with its lean principles and practices.

Sustainability is now recognised as a key driver for new directions in manufacturing and includes the entire value stream and culture of the organisation. Whilst the foundation principles of lean remain essential we need to showcase that it is not just about doing 'more with less' but when correctly integrated into the business culture provides the enterprise with sustainable and competitive advantages.

Project background

During 2009-10, MSA commissioned two development projects to:

- examine the significance of various reports and initiatives by federal and state/territory governments about 'environmental sustainability'
- respond to repeated requests by industry representatives and registered training organisations (RTOs) to better address the skilling needs of workers in the 'environment' and 'sustainability' industry sectors.

This work was influenced by a number of strategic drivers. In 2009, the ISCs jointly developed a paper, *Environmental Sustainability – An Industry Response*, that expressed concern about:

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- The lack of an overarching picture and broad understanding of how skills relating to sustainable practice are being developed and embedded within industry.
- The growing plethora of accredited courses and policy.

There has also been a strong and sustained interest by some of MSA's stakeholders in the development of a stand-alone cross industry Training Package to address the very diverse needs of the 'environment' and 'sustainability' industry sectors. This is because:

- The skilling needs of the 'environment' sector are not adequately addressed by the small number of 'environmental' units of competency developed during the continuous improvement of the Laboratory Operations Training Package (PML99, PML04 and MSL09) and the existing accredited courses.
- Similarly, the needs of the 'sustainability' sector are not fully met by the MSAENV272B, MSAENV472B and MSAENV672B units of competency.

In Australia, 'environmental' technicians and paraprofessionals work in diverse fields, such as:

- environmental monitoring of air, clean water (catchments/water supply/surface and groundwater, and environmental flows), contaminated land and groundwater, soil and noise
- environmental compliance inspection
- clean-up of spills, hazardous materials and site remediation
- energy technologies and services
- environmental laboratory services
- environmental information management systems
- environmental site management
- geotechnical services and civil engineering
- water treatment, storm and wastewater management
- health and safety (e.g. noise and air quality)
- natural resources management
- pollution control and prevention
- solid and hazardous waste management.

They are also employed in the rapidly growing industry sectors of 'sustainability' and 'resource efficiency' (e.g. carbon/energy/water/waste auditing).

In the private sector, most technicians and paraprofessionals are employed by large companies associated with environmental consultancies, manufacturing, mining and major infrastructure projects. In the public sector, the emphasis of work is more about sustainable management of natural resources, compliance and community education.

Two MSA initiatives to develop products to address the skilling needs of these workers are outlined below.

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Sustainable Operations Qualifications

Manufacturing Skills Australia commissioned Richard Jenkins & Associates to examine ways to respond to increased industry interest and need in the area of skills required to increase the sustainability performance of manufacturing operations and operations of suppliers and customers along their manufacturing value chain. The new qualifications and units of competency are designed to provide the skills to enable enterprises to:

- audit their own sustainability performance
- develop a strategic plan and response to non-conformances
- develop strategies for increasing the sustainability performance inside their own operations and with their customers and suppliers.

The units of competency provide the skills needed to respond to current and new sustainability compliance regimes and environmental standards especially those associated with carbon and carbon equivalent use and management. While the units are not specific to any one regime they enable an RTO to provide training in skills required for National Greenhouse Response Strategy (NGRS) reporting, internationally accepted reporting arrangements, such as the Global Reporting Initiative (GRI), and likely Australian compliance and reporting arrangements, including carbon pricing or trading arrangements.

The skills covered by the units include technical skills, such as mass balancing and auditing, and more strategic units with a strong similarity to processes used in lean manufacturing to identify and minimise waste.

MSA has met these needs through the development of Sustainable Operations qualifications and units of competency.

Environmental Monitoring and Technology qualifications

Dr Ivan Johnstone (CIT Solutions) was commissioned to canvass the need for VET sector qualifications in the broad fields of environmental monitoring and technology and environmental management and to conduct a detailed competency analysis for the relevant occupational groups.

Consultations involving both private and public sector enterprises throughout Australia identified the need for the following qualifications to cover the three highest priority occupational groups:

- environmental managers, environmental site coordinators, senior environmental officers, natural resource managers, water catchment managers and other job titles (Vocational Graduate Certificate in Environmental Management)
- environmental officers, environmental protection officers, environmental compliance officers, technical officers and other job titles (Diploma of Environmental Monitoring and Technology)
- environmental assistants, technical assistants and other job titles (Certificate IV in Environmental Monitoring and Technology).

MSA supported the findings and contracted Dr Johnstone to undertake the development of three new qualifications.

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Qualification Framework

The Australian Qualifications Framework

What is the Australian Qualifications Framework?

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

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

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

Qualifications

Training Packages can incorporate the following eight AQF qualifications.

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

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

Statement of Attainment

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

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

AQF Guidelines and Learning Outcomes

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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.

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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 section of equipment, services or contingency measures and within known time constraints.

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

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

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

Certificate IV

Characteristics of Learning Outcomes

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

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

Distinguishing Features of Learning Outcomes

Do the competencies enable an individual with this qualification to:

- demonstrate understanding of a broad knowledge base incorporating some theoretical concepts
- apply solutions to a defined range of unpredictable problems

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- 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.

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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.

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- 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.

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Qualifications and Packaging Rules

Sustainable Operations – target group and pathways

Sustainability for an organisation is impacted by its own operations, suppliers, customers, regulations, and the local community and ecological environment. The the new qualifications target the skills required to improve an organisation's sustainability performance. There are three Sustainable Operations qualifications each targeting a different level of focus within an organisation.

MSS40111 Certificate IV in Sustainable Operations

This qualification provides skills for employees who are:

- working at the team or area level
- required to contribute to sustainability related auditing or reporting
- implementing sustainability related changes within their own team, work area or section.

It provides specific sustainability related skills and is designed to complement qualifications supplying production, maintenance, logistics or other technical skills to industry.

This qualification applies to learners who have responsibilities for implementing sustainability related actions in part of a large organisation or in an entire small or medium enterprise. The focus of the qualification is on identifying, implementing and reporting on initiatives. Skills gained from this qualification may be applied independently or the learner may be part of a sustainability project team or be a technician assisting a manager or other expert. This qualification is suitable for providing the skills needed to identify and action easy to implement sustainability initiatives (often colloquially called 'low hanging fruit'). Other key roles could be assisting in audits and reporting. This qualification does not supply technical skills in operation of plant and equipment.

MSS50111 Diploma of Sustainable Operations

This qualification provides skills for employees who are working in a managerial, technician or paraprofessional role in regards to sustainability across the whole of the enterprise. It targets employees who have enterprise level responsibility for:

- developing a business case for sustainability changes
- auditing and reporting
- conducting life cycle analyses
- designing a sustainable product or process
- working with value chain members on sustainability
- liaison with other organisations and community representatives.

It meets industry needs for a qualification that provides technical skills to conduct enterprise wide sustainability related activities, including:

- mass balancing
- auditing and other carbon and carbon equivalent measuring
- formal reporting against standards and regulations
- design for sustainability.

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The qualification has a mixture of general and specific sustainability units of competency, including specific auditing units for energy emissions, water and transport related audits. The qualification is designed to complement other qualifications that provide underpinning technician skills.

This qualification targets learners who have sustainability as either their primary work role or where sustainability is a major part of a broader work role. A typical work role would be a technical officer, technologist or similar in an organisation responsible for improvements in efficiency and sustainability or a specialist sustainability manager.

Key skills covered by the MSS50111 Diploma of Sustainable Operations include regulatory commercial reporting on sustainability for an organisation, calculating carbon and carbon equivalent usage and emissions reduction or elimination of waste (as in 'muda' under lean manufacturing), sustainability auditing of material, energy, water usage and transport.

The MSS50111 Diploma of Sustainable Operations can be either entry level or follow-on study from another qualification. However, like all the MSA Sustainable Operations qualifications it does not supply technical or engineering skills related to an organisation's operations. For example, if the organisation is a foundry, the knowledge and skills related to foundry operations would need to be gained through an engineering metallurgy or science qualification.

MSS70111 Vocational Graduate Certificate in Sustainable Operations

This qualification targets the senior manager who must set a strategic direction on sustainability for the organisation, and provide leadership and planning for the deployment of the sustainability strategy.

The Vocational Graduate Certificate is not an entry level qualification and assumes that the learner has one or more of the following:

- an Advanced Diploma or Diploma of sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

The qualification assumes that learners are already familiar with the basic concepts of sustainability (e.g. triple bottom line, concept of emissions, carbon and carbon equivalence, and environmental impact) and also familiar with the operations and processes used within the organisation.

Impact for RTOs

For most RTOs the Sustainable Operations qualifications will represent a new area of delivery at the qualification level. However, many if not most RTOs have had previous experience of sustainability related delivery at the unit level especially in regards to the generic sustainability units and similar units developed by other ISCs.

Some of the higher level technical skills in the Diploma and Vocational Graduate Certificate qualifications are unlikely to be able to be effectively delivered unless project-based methodologies are adopted with students requiring access to a workplace to be able to identify and determine the impact of sustainability related changes on production and associated support activities.

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Environmental Monitoring and Technology – target group and pathways

The new qualifications include clear environmental science and technology coverage and will enable environmental officers, compliance officers, technicians and field officers to measure and address enterprise impacts on air, water and other external environmental conditions. Other inclusions will be implementation of legislation, development and implementation of policy as well as reporting requirements and development of strategic operational plans and procedures. There are three Environmental Monitoring and Technology qualifications each targeting a different level of focus within an organisation.

The new qualifications will address the skilling needs of technicians and paraprofessionals who:

- collect, analyse and report environmental data
- contribute to the assessment of environmental risks and impacts
- develop and/or implement policies, management plans and strategies, and work practices associated with sustainable development, environmental management, waste management, pollution control, rehabilitation and restoration of sites, and catchment areas and regions
- install, operate, and maintain new 'sustainable' technologies
- monitor and report environmental/sustainability performance and compliance
- improve the knowledge and skills of workers and community members about environmental management and sustainability.

MSS40211 Certificate IV in Environmental Monitoring and Technology

This qualification recognises that some industry sectors employ environmental assistants and technicians who have broad technical knowledge and skills in the area of environmental sampling and testing and some understanding of the industry processes and/or ecosystems that they are working with. These personnel do not have the more substantial knowledge of environmental monitoring; complex instrumentation; data analysis; environmental impacts and the strategies for minimising these impacts and remediation/rehabilitation of sites, that is provided by the MSS50211 Diploma of Environmental Monitoring and Technology for environmental officers.

MSS50211 Diploma of Environmental Monitoring and Technology

This qualification is typically used to prepare new employees or develop the skills of existing workers performing an environmental officer role in most industry sectors. The roles include environmental officers, environmental protection officers, environmental compliance officers, environmental technicians and similar personnel employed by enterprises and Commonwealth, state/territory/local governments.

Employees of enterprises are more likely to be involved with environmental monitoring, technology, internal auditing and continuous improvements to enhance compliance and minimise the environmental impacts of processes. Government employees may be involved with inspection/auditing of enterprises and negotiating appropriate responses to instances of non-compliance. Environmental officers often work with environmental scientists, engineers, planners and community groups to manage and conserve natural systems and resources, minimise pollution, remediate/rehabilitate sites and trial practical strategies to protect and improve ecosystems.

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MSS70211 Vocational Graduate Certificate in Environmental Management

This qualification applies to environmental site coordinators, environmental managers and senior environmental officers who oversee environmental monitoring and management activities at a site or for a significant environmental management program or project.

The qualification covers the skills and knowledge required by technical specialists who already have a relevant higher education or vocational qualification, or have extensive vocational experience without formal qualifications and require the competence to coordinate environmental monitoring and management activities at a site or for a significant environmental management program or project.

Impact for RTOs

Currently, there are no Training Package qualifications for personnel with whole job roles within the 'environment' and 'sustainability' industry sectors described above.

There are many isolated 'environmental' and 'sustainability' related units of competency in Training Packages, such as:

MSL09 Laboratory Operations

MSA07 Manufacturing

RTD02 Conservation and Land Management

LGA04 Local Government

BSB07 Business Services

PRM04 Asset Maintenance

RII09 Resources and Infrastructure.

There is also suite of qualifications (Certificate II, III, IV, Diploma and Advanced Diploma in Conservation and Land Management) within the RTD02 Conservation and Land Management Training Package for personnel working in conservation earthworks; Indigenous land management; lands, parks and wildlife natural area restoration; weed management and vertebrate pest management. However, these qualifications address only one area of employment within the wider sector.

As at March 2011, there were also a range of relevant accredited courses listed on the www.ntis.gov.au website:

80892 Diploma of Ecology and Environmental Management (ACT expires 31/12/2013)

52017 Diploma of Environmental Science (Management) (WA expires 30/11/2011)

52016 CIV in Environmental Science (Management) (WA expires 30/11/2011)

52015 CIII in Environmental Science (Management) (WA expires 30/11/2011)

51828 Advanced Diploma of Environmental Engineering (WA expires 31/08/2010)

30845 CIV in Management of Safety and Environmental practices (QLD expires 24/06/2014)

30657 CIV in On-Site Environmental Management (QLD expires 19/02/2012)

30584 Diploma of Environmental Sustainability (QLD expires 05/12/2010)

91337 CIV in Environmental Monitoring and Technology (NSW expires 31/12/2012)

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91412 Diploma of Environmental Monitoring and Technology (NSW expires 31/12/2012)

91267 Advanced Diploma of Applied Environmental Management (NSW expires 31/12/2010)

40536 Diploma of Environmental Management (SA expires 31/12/2011)

40535 CIV in Environmental Technology (SA expires 31/12/2011)

21645 Diploma of Sustainability (VIC expires 30/06/2010)

The new flexible qualifications in MSS11 have the potential to replace most, if not all, of these accredited courses throughout Australia.

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 Skills Australia - www.mskills.com.au.

Not applicable

TARGETS

- INDIVIDUALS
- ENTERPRISE
- CONSULTANTS
- GOVERNMENT
- REGULATORS
-

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

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Skill Sets in this Training Package

This section provides information on Skill Sets within this Training Package, with the following important disclaimer: Readers should ensure that they have also read the part of the Training Package that outlines licensing and regulatory requirements.

Where this section is blank, nationally recognised Skill Sets have yet to be identified in this industry.

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 Organisations (RTOs) may contextualise units of competency in this endorsed Training Package to reflect required local outcomes. 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 Training Package must be within the bounds of the following advice:

- RTOs must not remove or add to the number and content of elements and performance criteria.
- RTOs can include specific industry terminology in the range statement.

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- Any amendments and additions to the range statement made by RTOs must not diminish the breadth of application of the competency, or reduce its portability.
- RTOs may add detail to the evidence guide in areas such as the critical aspects of evidence or required resources and infrastructure—but only where these expand the breadth of the competency and 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

This sub-section contains a statement that the unit contains Employability skills.

Pre-requisite 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)

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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;

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- how consistency in performance can be assessed over time, various contexts and with a range of evidence; and
- the required underpinning knowledge and skills
-

Employability Skills in Units of Competency

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

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

How Employability Skills relate to the Key Competencies

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

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

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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.

Sample unit of competency components showing Employability Skills

The following table shows the sequence of a unit of competency, and each cell contains text taken from a range of units. It provides examples of where and how various Employability Skills could be embedded in each component.

Please note that in the example, the bracketed Employability Skills are provided for clarification only and would not be present in units of competency within this Training Package.

Unit Title	Give formal presentations and take part in meetings **(Communication)**
Unit Descriptor	This unit covers the skills and knowledge required to promote the use and implementation of innovative work practices to effect change. **(Initiative and enterprise)**
Element	Proactively resolve issues. (problem solving)
Performance Criteria	Information is organised in a format suitable for analysis and dissemination in accordance with organisational requirements. **(Planning and organising)**
Range Statement	Software applications may include email, internet, word processing, spreadsheet, database or accounting packages. (technology)
Required Skills and Knowledge	Modify activities depending on differing workplace contexts, risk situations and environments. **(Learning)**

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	Work collaboratively with others during a fire emergency. (teamwork) Instructions, procedures and other information relevant the maintenance of vessel and port security. **(Communication)**
Evidence Guide	Evidence of having worked constructively with a wide range of community groups and stakeholders to solve problems and adapt or design new solutions to meet identified needs in crime prevention. In particular, evidence must be obtained on the ability to: • assess response options to identified crime-prevention needs and determine the optimal action to be implemented • in consultation with relevant others, design an initiative to address identified issues. **(Initiative and enterprise).**

Employability Skills Summaries and units of competency

An Employability Skills Summary exists for each qualification. Summaries include broad advice on industry expectations with regard to Employability Skills at the qualification level. Summaries should be used by trainers and assessors to assist in identifying the Employability Skills requirements contained within units of competency.

Employability Skills in MSS11

These qualifications are directed at scientific and technology based occupations. It is a key requirement for people working in these roles to recognise and report non-conformance, and maintain security and confidentiality of all client/enterprise data and information. They generally work under strict operating procedures and must be able to access, record and present information accurately. Initiative and planning is required at all levels.

Examples from MSS11 of Employability Skills embedded within unit components	
Unit component	Example of embedded Employability Skill
Unit Title	Analyse and determine organisational risk areas in sustainability (Organising, problem solving, initiative, enterprise)
Unit Descriptor	This unit of competency covers the analysis of an organisation's interactions with its environment, the specifics of the local situation and determining risks and vulnerabilities (hot spots) for close monitoring or action. It may be applied to an entire organisation, part of a large organisation or part/all of a value chain. (Problem solving, planning, technology, initiative)
Element	Communicate required responses as appropriate (Communication, problem solving, self-management, teamwork, enterprise)

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Examples from MSS11 of Employability Skills embedded within unit components	
Unit component	Example of embedded Employability Skill
Performance Criteria	Analyse data which may be appropriate to communicate with stakeholders (Technology, self-management, learning, communication, team work)
Range Statement	Process mapping is a technique for visualising/drawing a set of interrelated work activities characterised by a set of inputs and value-added tasks that produce a set of outputs. It applies to any process producing a good or a service (Learning, technology, initiative, planning, problem solving)
Required Skills and Knowledge	sources and impacts of pollution and other ecological degradation and methods of eliminating, controlling or reducing them interpreting specifications, operating procedures, manuals, regulations and other complex documents (Learning, technology, self-management, communication)
Evidence Guide	Critical aspects of assessment and evidence include: analysing sustainability susceptibilities for a chosen portion of a value chain identifying appropriate responses communicating the above, as appropriate. (Initiative and enterprise, learning, planning and organising, communication, problem solving, technology, self management, teamwork)

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.

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Assessment System Overview

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

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).

Industry Requirements

MSS11 Assessment Advice

The MSS11 Training Package covers environmental monitoring and technology skills and skills used to audit and improve the sustainable operations of organisations. All qualifications have been designed to apply across a wide range of industries sectors and locations and in circumstances where the environmental monitoring and technology and sustainable operations skills will often have to be applied in conjunction with other skills and knowledge relevant to the processes and products used within or manufactured by the organisation. For this reason assessment should be conducted in the workplace or in a in a work-like environment. Many of the units also require the measurement of environmental and other indicators over a period of time and for this reason project based assessment is also preferred.

Advice on integrated assessment for MSS units

The Sustainable Operations Training Package is comprised of units of competency that will rarely be used in isolation from the operations of the organisation subject to environmental monitoring or improvement in their sustainable operation. A single unit of competency will be unlikely to 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.

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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 any prerequisites

Principles of Assessment

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

- validity
- reliability
- flexibility
- fairness
- sufficiency

These principles must be addressed in the:

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

Validity

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

(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

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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.

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

Assessment Requirements

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

Assessment Strategies

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

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National Recognition

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

Access and Equity and Client Outcomes

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

Monitoring Assessments

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

Recording Assessment Outcomes

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

Issuing AQF qualifications and Statement of Attainment

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

Licensing/Registration Requirements

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

The developers of this Training Package consider that no licensing or registration requirements apply to RTOs, assessors or candidates with respect to this Training Package. Contact the relevant State or Territory Department(s) to check if there are any licensing or registration requirements with which you must comply. For further information on this topic contact [insert a contact/URL for the latest information on licensing/registration requirements – the website of the Industry Skills Council may be appropriate, then delete this text].

Licensing requirements – MSS11

Industry is subject to a range of environmental and sustainability related regulatory control. Depending on the actions taken by individuals to improve environmental and sustainability outcomes for organisations occupational licences may be required e.g. electricians undertaking sustainability related improvements to equipment will generally need an electrical worker’s licence. The occupational licences required will vary with the nature of the work and to some extent on 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.

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Contact the relevant State or Territory Department(s) to check if the licensing/registration requirements described below still apply, and to check if there are any others with which you must comply. For further information contact [Note insert a contact/URL for the latest information on licensing/registration requirements – the website of the Industry Skills Council may be appropriate, then delete this text].

Requirements for Assessors

In order to conduct assessment for statutory licensing or other industry registration requirements, assessors must meet the requirements outlined in the following chart, in addition to the AQTF requirements.

LICENCE/REGISTRATION	JURISDICTION	REQUIREMENTS

These requirements may be met through

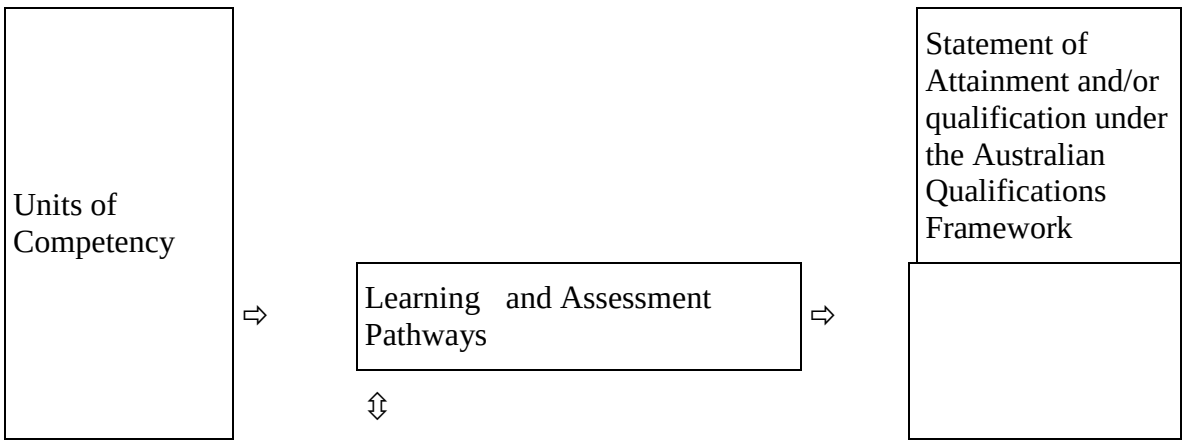
[Note: insert relevant information detailing how these requirements may be met, including name, address and contact details of appropriate providers, then delete this italicised text].

Pathways

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

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

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



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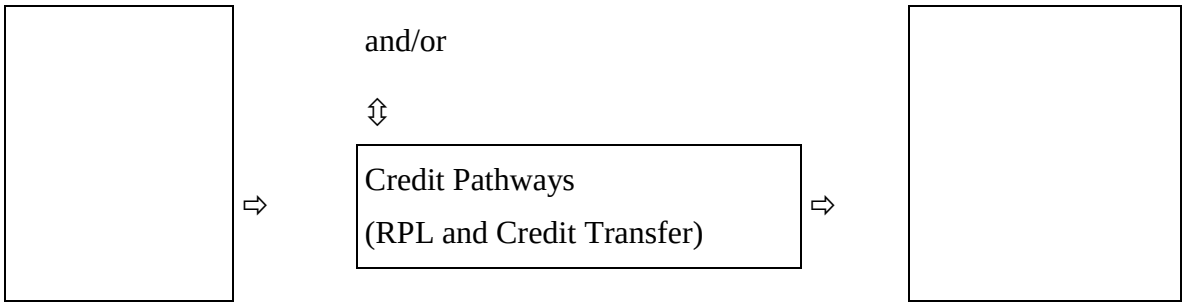

Each of these assessment pathways leads to full recognition of competencies held – the critical issue is that the candidate is competent, not how the competency was acquired.

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

Learning and Assessment Pathways

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

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

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

Credit Pathways

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

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

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

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

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

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

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

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

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

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

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

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

Credit Transfer

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

This process involves education institutions:

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

Combination of Pathways

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

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

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

Assessor Requirements

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

Assessor Competencies

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

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

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

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

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

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

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

Designing Assessment Tools

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

Use of Assessment Tools

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

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

Using Prepared Assessment Tools

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

Developing Assessment Tools

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

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

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

Language, Literacy and Numeracy

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

Conducting Assessment

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

Mandatory Assessment Requirements

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

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

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

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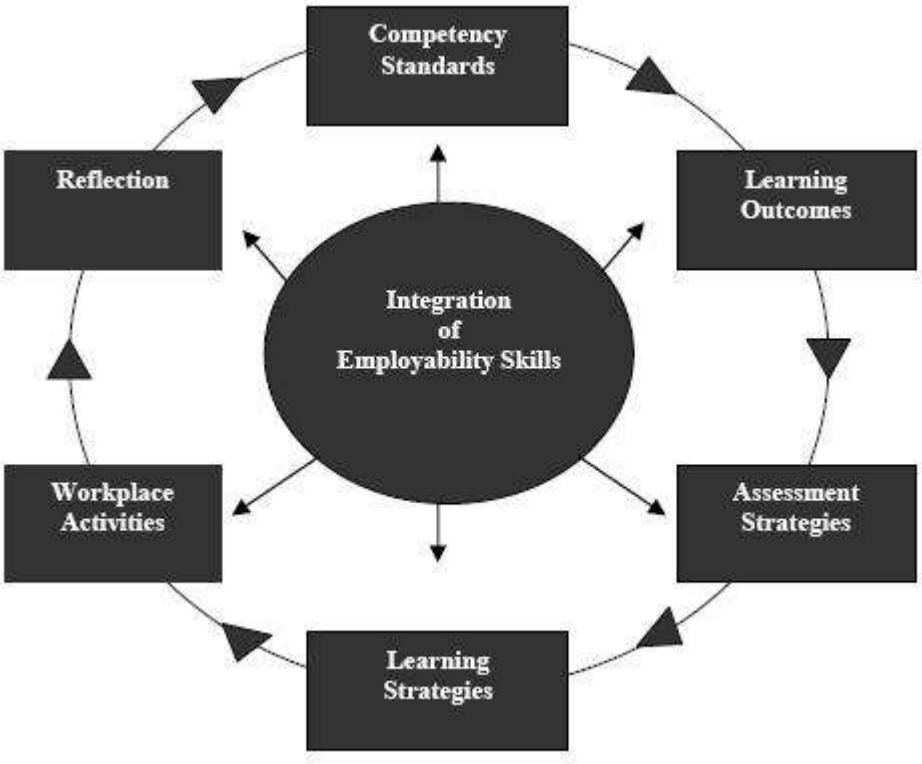
Assessment of Employability Skills

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



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

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

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

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

For more information on Employability Skills in

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

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

Access and Equity

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

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

Reasonable Adjustments

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

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

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

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

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

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Further Sources *of Information*

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

Contacts

Industry Skills Council

Manufacturing Industry Skills Council

PO Box 289

North Sydney NSW 2059

Phone: (02) 9955 5500

Fax: (02) 9955 8044

Email: info@mskills.com.au

Website: http://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>

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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.ntis.gov.au>

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

A**ssessment Resources**

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

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

Resources can be purchased or accessed from:

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

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

- Manufacturing Skills Australia - www.mskills.com.au

Appendix 1: Development of MSS11

Development of the Sustainability Training Package

Sustainable Operations

The main drivers for MSA in developing the new Sustainable Operations qualifications and units of competency has been the very strong interest shown by both industry and RTOs through special workshops and conferences that MSA has convened on sustainability, as well as consultations and research undertaken by MSA and its consultants. Through these processes it has been identified that industry in the future will require skills in a number of sustainability related areas. These are:

- measurement and auditing of current sustainability related performance and the impact of changes
- formal and informal reporting

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- determining the most appropriate changes and responses to the need for improved sustainability performance
- increasing the capability of their employees in sustainability
- increasing the sustainability performance of members of their value chain.

MSA has met these needs through the development of Sustainable Operations qualifications and units of competency.

A list of individuals and organisations consulted during this process follows. The value of their expertise and input is gratefully acknowledged.

Name	Organisation	State
Celeste Howden	RTObiz	NSW
Lee Miles Editor for Australian Career Practitioner	Milestone Ink	NSW
Liz Hellenpach Industry Officer (Manufacturing, Engineering, Logistics and Transport) Western Sydney Institute of TAFE	TAFE NSW	NSW
Louis Maule	TAFE NSW Western Sydney Institute Mt Druitt	NSW
David Tiller	Australian Industry Group	NSW
Frouke de Reuver Sustainability Programs Division	Department of Environment and Climate Change	NSW
Stephen Johnson and Kim Peterson Training and Education Support Industry Skills Unit	TAFE NSW Western Sydney Institute	NSW
Doug Fisk and Ray Edwards	Corporate Partners Pty Ltd	NSW
Archie Wright	Major Industries Training Advisory Council Ltd	NT
Barry Cramond	TEATAC (NT) Inc	NT
Erik Salonen General Manager	Manufacturing Skills Queensland	QLD
Gordon Elledge Assistant Director	Skills Tech Australia, TAFE Queensland	QLD
Linda Schlanger Director, Vocational Education and	Sunshine Coast Institute of TAFE	QLD

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Name	Organisation	State
Training		
Anne-Maree Chapman	The Improve Group	QLD
Helen Bulle	Department of Education & Training	
Gavin Dicinosk	National Safety Solutions	QLD
Emma Earl	Australian Industry Group	QLD
Sheryle Gherardi	Central Queensland University (CQU) Gladstone Campus	QLD
Kurt Heidecker CEO	Gladstone Industry Leadership Group	QLD
Phil Henry Regional Director	Rockhampton Centre Department of Tourism & Industry	QLD
Ros Mann Gladstone Manager	BG Australia	QLD
John Marxsen Training & Development Specialist	NRG Gladstone Operating Services Pty Ltd	QLD
Terri Pienaar	Rio Tinto Leader Capability Development People & Organisation Support (Australasia)	QLD
Jos De Jonckheere	Rio Tinto Boyne Smelter	QLD
Karen Porter CEO	Gladstone Engineering Alliance Inc.	QLD
Helen Quaife Principal Regional Development Officer	Department of Tourism, Regional Development and Industry (DTRDI)	QLD
Geoff Adams Manager, Office of Advanced Manufacturing	Department of Tourism, Regional Development and Industry	QLD
Monique Simpson Operations Manager	Careers Australia Institute of Training	QLD
Mike Sisley Technical Manager	Queensland Alumina Ltd (QAL)	QLD
Col Stanger Engineering Sales	ITT	QLD

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Name	Organisation	State
Susan Watkins	Gladstone Area Promotion and Development Ltd (GAPDL) (Gladstone Ports)	QLD
Kerry Whitaker General Manager	Gladstone Area Group Apprentices Ltd (GAGAL)	QLD
Ian Lawrence Director – Business Performance	SkillsTech Australia	QLD
Alan Bradford Global Product and Support Manager	Ground Probe	QLD
Gus Taddeo Managing Director	Cook Medical	QLD
John Colvin General Manager	Prochem Agencies Pty Ltd	QLD
Rowan Hutson Senior Advisor	Queensland Energy Resources (QER)	QLD
Derek Cupp Executive Officer	Manufacturing Industry Skills Advisory Council SA Inc	SA
Paul Bettison Educational Manager, Engineering	TAFE SA	SA
Peter Daley	TAFE SA	SA
Tony Williams	TAFE SA	SA
Angela Coker Training Manager	AWD Systems Centre	SA
Kylie Furnell Training Coordinator	Defence Teaming Centre (DTC)	SA
Kerryn Smith Project Manager and Assistant Director – Skills & Workforce	Defence Teaming Centre (DTC)	SA
Ian Curry	Australian Manufacturing Workers Union	SA
Robert Squires	TAFE Tasmania	TAS
Debra Doherty	Skills Tasmania	TAS
Dianne Williams	Consultant	VIC
Juris Liberts Manager, Centre for New	Swinburne University of Technology	VIC

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Name	Organisation	State
Manufacturing		
Lee-Anne Fisher	Australian Industry Group	VIC
Garry Edwards Manager	Kangan Institute of TAFE Competitive Manufacturing Centre (CMC)	VIC
John Cawley Associate Director, Information and Infrastructure (now at Swinburne)	Victoria University (TAFE)	VIC
John McKay Centre Director	Chisholm Institute of TAFE Centre for Integrated Engineering & Science	VIC
Trevor Lange Curriculum Maintenance Manager General Manufacturing	Chisholm Institute of TAFE	VIC
L Cooper	Chisholm Institute of TAFE	VIC
Noel Sutcliffe	Chisholm Institute of TAFE	VIC
Graham Smith Senior Educator, Engineering Programs	Holmesglen TAFE	VIC
Paul Kennett Executive Director	Manufacturing & Engineering Skills Advisory Board (MESAB)	VIC
Kent Williamson Manager, Textile and Design Specialist Centre	RMIT University	VIC
Shane Infanti CEO	AMTIL	VIC
Craig Nisbet Group Manager – Risk	Citywide	VIC
Kylie Prout Manager – Quality	ASSA ABLOY Australia Pty Limited	VIC
Wendy Davies	Consultant	VIC
Trish Kerin Sustainability Manager	Australian Vinyl Corp Pty. Ltd.	VIC
Gregory Hughes Business Manager VIC/TAS	Sims Metal Management	VIC

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Name	Organisation	State
Mark Kaufmann HR Manager	VIP Packaging	VIC
Sharyn Twist Human Resources Co-ordinator	VIP Packaging	VIC
Belinda Legane Safety Quality and Environment Manager	Urban Maintenance Systems	VIC
Chris Komen General Manager – Technical Solutions Group	Mecrus Group	VIC
Terry Young Production Manager	Gainsborough Hardware Industries	VIC
Geoff Gardiner General Manager Service Sustainability	City West Water Ltd	VIC
Luke Kewell Senior Consultant – Climate Change and Sustainability Services	SMEC Australia Pty Ltd	VIC
Dr Sammy Khalil Senior Consultant – Climate Change and Sustainability Services	SMEC Australia Pty Ltd	VIC
Mick Stevens Quality Assurance Manager	Montague Fresh	VIC
Joe Croke Environment and Sustainability Manager	Cadbury	VIC
Karolina Vrklevski Training Manager	Cadbury	VIC
Patten Bridge General Manager Sustainability	Murray Goulburn Co-operative	VIC
Bill Rendall Environment and Water	Bayside Personnel	VIC
Katherine Simmons Sustainability Project Manager	Lyondell Basell Australia Pty Ltd	VIC
Susan Staples Manager – Sustainability, Climate	KPMG	VIC

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Name	Organisation	State
Change and Water		
Vivienne L Filling General Manager Environment & Energy Services	Australian Industry Group	VIC
Garry McDonald, Scott McKenry, Linda Condon, Kathryn Donnelly Swinburne National Centre for Sustainability	Swinburne University	VIC
Sandy Powell	Goulburn Ovens Institute of TAFE	VIC
Carlo de Martinis	Private Consultant	VIC
George Adda Klaus Bienert Curriculum Maintenance Manager	Box Hill Institute of TAFE	VIC
Kay Gerard CEO	Food, Fibre & Timber Industries Training Council. (WA) Inc	WA
David Hicks	Engineering and Automotive Training Council	WA
Bill Roberts Project Manager	Central Institute of Technology	WA

Environmental Monitoring and Technology

In recent decades, ownership of the 'environment' and 'sustainability' has moved beyond the 'green movement' and there is now broad agreement that returning human use of natural resources to within sustainable limits will require a major collaborative effort of individuals, industries, communities, governments and countries.

As a result, recent national strategies and actions plans for 'living more sustainably' address a very wide range of issues, such as:

- education for environmental sustainability and meeting emerging skills needs
- reorganising living conditions (e.g. eco-villages, eco-municipalities and sustainable cities)
- reappraising economic sectors (permaculture, green building and sustainable agriculture) or work practices (sustainable architecture and waste minimisation)
- using science to develop new technologies (improved materials, more efficient processes and renewable energy)
- promoting adjustments in individuals' lifestyles.

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Many employers state that job seekers trained at Australian and overseas universities lack practical environmental sampling, monitoring and field testing skills while technicians already in the workforce (some of whom may have VET training) require further skills development. In particular, they report a widespread inability to recruit personnel who are able to:

- 'read the landscape' accurately
- set up, optimise and operate environmental monitoring instruments to obtain reliable results for a range of samples, techniques and conditions
- coordinate environmental management activities at sites.

The new environmental monitoring and technology units of competency and qualifications have been developed specifically to address the skilling needs outlined above in a nationally consistent manner.

The following individuals and organisations participated in the development process of the environmental monitoring and technology units of competency and qualifications. The value of their expertise and input is gratefully acknowledged.

Name	Enterprise/Organisation	State/Territory
Peter Moore	WSP Environmental Pty Ltd	NSW
Frouke De Reuver	Dept. Of Environment and Climate Change (Sustainability Programs)	NSW
Derek Low	Parsons Brinckerhoff	NSW
Megan Griffiths	University of Sydney	NSW
Galia Nikolaeva	Douglass Partners	NSW
Deb McCall	Wetland Care Australia	NSW
Kim Peterson	NSWTAFE Curriculum Centre	NSW
Lynda Lewis	New England Institute of TAFE	NSW
Louis Maule	Blacktown TAFE College	NSW
Greg Schumacher	AECOM	NSW
Graham Taylor	AECOM	NSW
Steven Smith	Advitech	NSW
Jeremy Pola	Advitech	NSW
David Bone	On Site Environmental Management Pty Ltd	NSW
Adam Samuelson	NSW TAFE (Hunter)	NSW
Graham Fullick	NSW TAFE (Hunter)	NSW
David Barker	NSW TAFE (Hunter)	NSW
Denise Hatton	NSW TAFE (Hunter)	NSW

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Jackie Roser	NSW TAFE (South Western Sydney Institute)	NSW
Alistair Henderson	Baltec Australia	QLD
Chris Johnstone	AECOM	QLD
Peter Scott	AECOM	QLD
Brad Cartwright	AECOM	QLD
Caroline Comino	Southbank Institute of Technology	QLD
David Wainwright	Environmental Sciences Division, Dept. Of Environment & Resource Management	QLD
Andrew Martin	Occupational Hygiene Environment and Chemistry Centre, Dept Mines & Energy	QLD
Anne Brown	Canberra Institute of Technology	ACT
Bill Martin	Canberra Institute of Technology	ACT
Noel Hamey	Canberra Institute of Technology	ACT
Terry O'Leary	Canberra Institute of Technology	ACT
Kathryn Smith	Golder Associates	VIC
Tim Routhey	URS Australia Pty Ltd	VIC
Phillip McGlashan	Swinburne University of Technology TAFE	VIC
Elspeth King	Swinburne University of Technology TAFE	VIC
Julie Hayles	Victoria University	VIC
Ray Black	The Gordon TAFE	VIC
Craig Sandford	The Gordon TAFE	VIC
Ray McKenzie	Chisholm Institute	VIC
Trevor Lange	General Manufacturing, Chisholm Institute	VIC
Drew Gowling	Golder Associates Adelaide Office	SA
Costante Costa	Golder Associates Adelaide Office	SA
Len Turczynowicz	Golder Associates Adelaide Office	SA
Sophie Smith	URS Adelaide Office	SA
Wayne Morling	GSA	SA
Tamara Shinners	GSA	SA
Nick Crouch	TAFE SA	SA
Barry Savva	TAFE SA	SA
Neil Sommers-Cain	TAFE SA	SA
Jim Plummer	TAFE SA	SA

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Jenny Watling	University of Adelaide	SA
Raelene Wildy	University of Adelaide	SA
Bob Fry	TAFE SA	SA
Margaret Davidson	Admissions & Curriculum Unit TAFE SA	SA
Helen Dootson	TAFE SA	SA
Jennifer Sparks	TAFE SA	SA
Diana Davis	TAFE SA	SA
Bonnie Hart	TAFE SA	SA
Kevin Dennis	Department of Water, Land, Biodiversity & Conservation	SA
Angela Murray		SA
Michele Rosano	Centre of Excellence in Cleaner Production Curtin University of Technology	WA
Andy Graham	Centre of Excellence in Cleaner Production Curtin University of Technology	WA
Jon Harper	CASANZ	WA
Sarah Brown	National Pollution Index Department of Environment & Conservation	WA
Kristie Stevens	Department of Environment & Conservation	WA
Philippe Najean	Department of Environment & Conservation	WA
Farah Adeeb	Department of Environment & Conservation	WA
Kym Squires	Department of Environment & Conservation	WA
Peter Johns	Department of Environment & Conservation Industry Regulation (SWAN)	WA
Gun Dolva	Central Institute of Technology East Perth	WA
Peter Douglas	Central Institute of Technology East Perth	WA
Kerry Bowe	Challenger Institute of Technology	WA
Adrienne Cavaney	Challenger Institute of Technology	WA
Pascaline Owers	Challenger Institute of Technology	WA

National TAFE Science Network

Members of the National TAFE Science Network also reviewed and provided feedback during development of draft units of competency and qualifications.

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MSS40111 Certificate IV in Sustainable Operations

Modification History

Not applicable.

Description

This qualification provides the skills and knowledge required to lead the implementation of sustainability related initiatives in a section of an organisation. The qualification has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations. The qualification is also appropriate for a technician or similar person who as part of a broader job role needs to undertake sustainability related work.

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.

Job roles/employment outcomes

The MSS40111 Certificate IV in Sustainable Operations specifies the competencies required to identify, implement and report on sustainability related initiatives within a section of an enterprise, such as a defined work area, work team or stage of production. It may also apply to a small or medium enterprise. It includes assisting organisations to meet their obligations under sustainability related regulatory arrangements, government or similar incentives or other initiatives that apply to the employee's area of operation.

The qualification also applies where an overview of sustainability related issues is required without the detailed technical underpinning skills, such as resource (e.g. water and carbon) mapping along a value chain, or mass balancing across a site or large enterprise. Where these skills are require the MSS50111 Diploma of Sustainable Operations should be considered.

Employment outcomes related to this qualification may include specialist roles such as a sustainability officer or sustainability project assistant. The qualification also provides specialist sustainability competencies to technical, supervisory or operational employees who do not have whole of enterprise responsibilities.

Application

This qualification provides sustainability skills that can be applied in the following organisations and environments:

- manufacturing enterprises
- organisations in a manufacturing value chain, such as:
  - suppliers
  - customers
  - distributors, warehouses, transport suppliers and other logistics support organisations

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- professional service suppliers to manufacturing, for example, legal, engineering, accounting, auditing and education and training suppliers.
-

Pathways Information

Pathways into the qualification

This qualification has no formal entry requirement. However, it should be noted that this qualification does not supply operational or technical skills. Most enterprises will expect technical skills relevant to their operations or equivalent vocational experience and for this reason the qualification is unlikely to be suitable for direct entry from school.

Pathways from the qualification

Further training pathways from this qualification include the MSS50111 Diploma of Sustainable Operations.

Additional qualification advice

This qualification provides the skills needed to measure current sustainability performance and to establish processes for improved sustainability performance within small and medium enterprises as well as sections or stages of production in larger organisations. It complements but does not duplicate qualifications supplying production, maintenance, logistics or other technical skills to industry. Where these skills are required appropriate qualifications from Manufacturing Skills Australia (MSA) and other Industry Skill Council (ISC) Training Packages should be considered.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

This qualification has no formal entry requirements.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	Industry/enterprise requirements for this qualification include:

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Communication	• Oversee implementation of sustainability improvement procedures in section or for stage of production and develop and distribute related information • Distribute and explain standardised documentation on behalf of an area or a work team • Share and discuss information with others about enterprise activities • Communicate workplace procedures • Provide information and clarifications to other employees on workplace procedures in relation to sustainability • Provide and interpret instructions, specifications, standard operating procedures and other work-related documents • Provide assistance or information to relevant personnel • Debrief on workplace changes with relevant stakeholders • Record production, emissions and other work-related information for a work area • Access and use workplace communication tools and equipment • Apply numeracy skills to work procedures • Provide information about team activities to managers, supervisors and customers
Teamwork	• Identify roles of work teams where teamwork is used as the form of work organisation • Supervise and lead others in a production environment • Share work-related information with peers, including team members, supervisors and management • Identify hazards to other employees and visitors • Review changes to work practices and work relationships with team leaders and other employees • Provide assistance with planning work operations as required • Seek assistance with work operations from specialists and other employees as required • Participate in multidisciplinary teams as required
Problem solving	• Monitor team production and maintenance activities and analyse inconsistencies, non-compliances, faults or hazards • Identify factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identify essential and non-essential practices • Implement methods of increasing features/benefits of products or processes • Monitor responsibilities of team and make improvements to work organisation • Identify process steps which cause a problem and suggest improvement processes • Monitor sustainability performance and identify improvement

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	opportunities and processes • Compare shift or area required performance with actual performance • Identify situations where compliance to specifications or safety standards is unlikely • Identify, recommend and implement improvements • Identify causes of identified faults and take appropriate action • Investigate causes of deviations from targets and standards in relation to sustainability • Undertake root cause analysis
Initiative and enterprise	• Manage team or area procedures and systems for optimum outcomes • Provide feedback on procedures and systems • Analyse problems, implications or suggestions for improvements • Adjust work activities according to changes in operating procedures or requirements • Identify methods of increasing contribution of team to sustainability • Identify and implement changes and improvements • Monitor processes and equipment to ensure cost efficiency • Implement and monitor work practices to reduce waste • Participate in multidisciplinary teams to develop new products or processes
Planning and organising	• Ensure work area complies with sustainability obligations and requirements • Implement improvements in accordance with procedures • Distinguish between essential and non-essential practices • Implement use of planning tools within work of team • Determine and prioritise required actions • Collect, organise and analyse information from work activities • Monitor work activities according to safety and workplace standards • Monitor production targets and outcomes • Interpret data and information as required by own job • Ask questions to ensure there is understanding of work requirements in teams and among other employees
Self-management	• Recommend methods of increasing own contribution to the value chain • Adjust work processes according to procedures and customer requirements • Identify and manage impact of change in own work • Minimise waste in own work activity • Assess own work performance

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	• Set personal objectives for work performance • Manage own time
Learning	• Identify skill requirements of self and team members • Arrange skill development training for self and others • Adapt to changing work requirements • Ask questions to aid learning of others • Identify personal skill gaps and additional skills needs • Ask questions to ensure understanding of own work requirements • Monitor own work and identify areas for improvement • Seek feedback on work performance • Provide feedback on work performance to team leaders and team members
Technology	• Monitor technology to ensure sustainability according to legislative requirements and workplace standards • Identify equipment and processes appropriate for team jobs and skill levels of team members • Provide appropriate equipment to ensure safety and efficiency according to skill levels of employees • Assess operational efficiency of technology within own skill level and that of team members • Analyse data and other information from equipment reports • Use information technology appropriate for job • Manage maintenance procedures appropriate to job and processes according to skill levels of team members

Packaging Rules

To be awarded the MSS40111 Certificate IV in Sustainable Operations, competency must be achieved in ten (10) units of competency.

- three (3) core units of competency
- seven (7) elective units of competency, as specified below.

Note: Units with prerequisites are marked with an asterisk. Refer to the unit for details.

Core units of competency

- Complete all three (3) of the following units of competency.

Unit code	Unit title	P

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MSS014001A	Improve sustainability through readily implementable change	
MSS014002A	Evaluate sustainability impact of a work or process area	
MSAENV472B	Implement and monitor environmentally sustainable work practices	

Elective units of competency

- Complete seven (7) units of competency, made up of:
  - a minimum of three (3) units from Group A
  - the balance of units, to a maximum of four (4), may be selected from:
    - Group A units, not previously selected
    - Group B units listed below.

Group A: Specialist elective units

Unit code	**Unit title**	**P**
MSS014003A	Optimise sustainability of a process or plant area	
MSS014004A	Develop team strategies for more sustainable use of resources	
MSS014005A	Apply proactive maintenance strategies to sustainability	
MSS014006A	Contribute to sustainability related audits	
MSS015005A	Develop required sustainability reports	
MSS024002A	Implement environmental management plans and procedures	
MSS024003A	Apply an understanding of environmental principles to a site	
LMFFDT4003A	Assess and record the lifecycle of a product	
MSACMT482A	Assist in implementing a proactive maintenance strategy	
MSACMT483A	Support proactive maintenance	
MSAPMOHS401A	Assess risk	
MSAPMSUP301A	Apply HACCP to the workplace	
MSL933003A	Apply critical control point requirements	

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MSL934001A	Contribute to the ongoing development of HACCP plans	
MSL974007A	Undertake environmental field-based monitoring	
MSL974009A	Undertake field-based, remote-sensing monitoring	
PMASUP520B	Review procedures to minimise environmental impact of process	

Group B: Other elective units

Unit code	**Unit title**	**P**
MSS027001A	Coordinate environmental management activities	
BSBRSK401A	Identify risk and apply risk management processes	
LMFFT4007B	Sample, inspect and test products to specifications	
LMTGN4002A	Participate in product engineering	
LMTGN4016A	Contribute to the development of products or processes	
MEM30016A	Assist in the analysis of a supply chain	
MEM13002B	Undertake occupational health and safety activities in the workplace	
MSACMC410A	Lead change in a manufacturing environment	
MSACMC411A	Lead a competitive manufacturing team	
MSACMC413A	Lead team culture improvement	
MSACMS400A	Implement a competitive manufacturing system	
MSACMS401A	Ensure process improvements are sustained	
MSACMS405A	Lead a manufacturing team using a balanced score card approach	
MSACMT230A	Apply cost factors to work practices	
MSACMT260A	Use planning software systems in manufacturing	
MSACMT261A	Use SCADA systems in manufacturing	

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MSACMT280A	Undertake root cause analysis	
MSACMT423A	Monitor a manufacturing levelled pull system	
MSACMT430A	Improve cost factors in work practices	
MSACMT440A	Lead 5S in a manufacturing environment	
MSACMT441A	Facilitate continuous improvement in manufacturing	
MSACMT450A	Undertake process capability improvements	*
MSACMT451A	Mistake proof a production process	
MSACMT452A	Apply statistics to processes in manufacturing	
MSACMT453A	Use six sigma techniques	*
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	
A maximum of two (2) Group B elective units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available for inclusion at Certificate IV level.		

Custom Content Section

Not applicable

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MSS40211 Certificate IV in Environmental Monitoring and Technology

Modification History

Not applicable.

Description

This qualification covers the skills and knowledge required to conduct environmental sampling, testing and monitoring in a variety of industry sectors.

Job roles/employment outcomes

The MSS40211 Certificate IV in Environmental Monitoring and Technology provides technical training across a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and rocks)
- geotechnical services
- natural resource management
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management.

Job roles targeted by this qualification include environmental assistants, environmental technicians and similar personnel employed by enterprises and Commonwealth, state/territory/local governments in the sectors listed above. Many of these employees are engaged in the monitoring of environmental impacts at industrial sites. They operate monitoring equipment, collect samples and conduct tests both in the field and at site laboratories. Other employees may collect a range of field data relating to the suitability of land and water use and process and present this data using geographical information systems (GIS) software.

In broad terms, they may:

- plan and conduct site sampling, field testing and measurements (e.g. meteorological)
- plan field work, arrange access to sites, logistics, equipment and supplies
- assemble, test, pack and transport equipment and supplies
- navigate using maps and global positioning systems (GPS)
- collect, process and present spatial/attribute data using GPS and GIS
- conduct field surveys of flora, fauna, water and soils
- calibrate and operate a wide variety of field-based instrumentation
- troubleshoot, repair, maintain and adapt instrumentation
- log and process data using a variety of computer hardware and software

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- interpret data to identify significant anomalies and trends
- report results and make logical conclusions
- define and solve problems of limited complexity where the information available is less obvious, but not contradictory, and can be determined by direct reasoning
- work under the direction and regular supervision of environmental officers, environmental site coordinators, site managers, or environmental scientists, engineers and planners
- work in a team and may have responsibility for their own work outputs.

Application

This qualification is typically used to prepare new employees or develop the skills of existing workers performing an environmental assistant role in a variety of industry sectors.

This qualification recognises that the industry sectors listed above employ environmental assistants and technicians who have broad technical knowledge and skills in the area of environmental sampling and testing and some understanding of the industry processes and/or ecosystems that they are working with. These personnel do not have the more substantial knowledge of environmental monitoring; complex instrumentation; data analysis; environmental impacts and the strategies for minimising these impacts; and remediation/rehabilitation of sites, that is provided by the MSS50211 Diploma of Environmental Monitoring and Technology for environmental officers.

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

Pathways Information

Pathways into the qualification

This qualification may be accessed by direct entry. Credit may be granted towards this qualification by those who have completed the MSL20109 Certificate II in Sampling and Measurement. Credit for this qualification may include units contained within relevant Skill Sets.

Pathways from the qualification

Further training pathways from this qualification include MSS50211 Diploma of Environmental Monitoring and Technology.

Additional qualification advice

Because specialisation is a requirement in some industry sectors for the MSS40211 Certificate IV in Environmental Monitoring and Technology, Registered Training Organisations (RTOs) may choose to issue a generic:

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- Certificate IV in Environmental Monitoring and Technology

or, where elective units of competency are packaged to suit a particular industry sector or specialisation, RTOs may choose to issue a:

- Certificate IV in Environmental Monitoring and Technology (specialising in xxxxxxx)

Industry sector/specialisations could include, but are not limited to:

- water
- air
- odour
- soil
- noise.
-

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

This qualification may be accessed by direct entry.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	**Industry/enterprise requirements for this qualification include:**
Communication	• Receive and pass on written and oral messages, provide relevant information in response to requests and demonstrate effective interpersonal skills, including negotiation and conflict resolution • Record and store data, perform basic calculations of scientific quantities and present information in tables and graphs • Report using verbal responses, data entry into enterprise information management system and brief written reports • Communicate with team members, supervisors and customers, other site personnel and members of the public • Interpret enterprise procedures and material safety data sheets (MSDS)

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Teamwork	• Work effectively with other people who may have diverse work styles and cultures • Promote cooperation and good relations in the team
Problem solving	• Deal with inquiries and requests for information in accordance with enterprise customer service requirements • Rectify simple equipment faults and errors in data using enterprise procedures • Recognise and report non-conformances or problems to appropriate personnel
Initiative and enterprise	• Access and provide relevant information within scope of responsibility and in accordance with enterprise procedures, including confidentiality requirements • Recognise potential incidents and take appropriate corrective action • Identify and report opportunities for improvements in procedures, processes, quality and equipment • Identify hazards associated with sites, samples, preparation methods, reagents and equipment and implement enterprise control measures
Planning and organising	• Plan and organise daily work activities to ensure the timely completion of tasks • Modify work plans to suit changing conditions and priorities • Assemble, check and organise specified equipment and materials
Self-management	• Follow enterprise procedures that reflect equal opportunity, anti-discrimination and non-harassment legislative requirements • Maintain enterprise standards of personal hygiene • Conduct work based on ethical values and principles and ensure quality and integrity of own work • Review own strengths, weaknesses and work practices for opportunities to continuously improve performance • Maintain security and confidentiality of all client/enterprise data and information • Use appropriate personal protective equipment to ensure personal safety when collecting, processing, testing, transferring or disposing of samples or conducting survey work
Learning	• Clarify instructions with supervisors to ensure a complete understanding of the task • Update knowledge and skills and take advantage of skill development opportunities • Coach others in participating in occupational health and safety (OHS) and environmental management issues
Technology	• Use communication, emergency, data recording, sampling and testing equipment, monitoring instruments and calibration standards

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	• Use computers, software and enterprise information management systems to collect, process and report information

Packaging Rules

To be awarded the MSS40211 Certificate IV in Environmental Monitoring and Technology, competency must be achieved in a total of sixteen (16) units of competency.

- **eight (8)** core units of competency
- **eight (8)** elective units of competency, as specified below.

Units listed under **core** are considered essential for all environmental assistants. The units listed as **electives** may only apply to some personnel according to the size and scope of the particular enterprise and industry sector.

Note: Units with prerequisites are marked with an asterisk. Refer to the unit for details.

Core units of competency

- Complete the following **eight (8)** units of competency.

Unit code	Unit title	P
MSS024001A	Work and communicate effectively as an environmental technician	
MSS024002A	Implement environmental management plans and procedures	
MSS024003A	Apply an understanding of environmental principles to a site	
MSS024004A	Process and present environmental data	
MSAENV272B	Participate in environmentally sustainable work practices	
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL974007A	Undertake environmental field-based monitoring	

Elective units of competency

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- Complete **eight (8)** elective units of competency, made up of:
  - a minimum of **five (5)** units from Group A
  - the balance of units, to a maximum of **three (3)** may be selected from:
    - Group A units, not previously selected
    - Group B and C units, listed below.

A maximum of **three (3)** Group B and C electives may be chosen from this Training Package, other endorsed Training Packages and accredited courses, where those units are relevant and available at Certificate IV. This could include relevant units available in AHC10 Agriculture, Horticulture and Conservation and Land Management Training Package.

Group A: Specialist elective units

Unit code	Unit title	P
MSS014006A	Contribute to sustainability related audits	
MSS024005A	Collect spatial and discrete environmental data	
MSS024006A	Perform sampling and testing of water	
MSS024007A	Collect and evaluate meteorological data	
MSS024008A	Recognise common geological landforms and samples	
MSS024009A	Assist with assessing and monitoring stormwater systems	
MSS024010A	Perform environmental biological techniques	
MSS024011A	Navigate in urban, regional and remote areas	
MSS024012A	Undertake simple environmental project activities	
BSBOHS406C	Use equipment to conduct workplace monitoring	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSL904001A	Perform standard calibrations	
MSL924002A	Use laboratory application software	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL974002A	Conduct geotechnical site investigations	*

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MSL974003A	Perform chemical tests and procedures	
MSL974006A	Perform biological procedures	*
MSL974009A	Undertake field-based, remote sensing monitoring	
PSPRAD703A	Perform basic radiation measurements	

Group B: Elective units

Unit code	**Unit title**	**P**
MSS015001A	Measure and report carbon footprint	
MSS015010A	Conduct a sustainability water use audit	
MSS015011A	Conduct a sustainability energy audit	
MSS015012A	Conduct an emissions audit	
MSS015018A	Inform and advise organisation and community representatives on sustainability issues	
MSS025001A	Assist with assessing site environmental indicators	*
MSS025002A	Assess the environmental risk or impact of a project activity or process	*
MSS025003A	Report environmental data	*
MSS025004A	Provide environmental information to customers	
MSS025005A	Produce site maps	*
MSS025006A	Collect and evaluate groundwater data	
MSS025007A	Perform sampling and testing of soils	*
MSS025008A	Monitor and evaluate noise	
MSS025009A	Perform sampling and testing of air	
MSS025010A	Assist with odour source assessment	
MSS025011A	Assist with odour field assessment	

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MSS025012A	Perform environmental microbiological tests	*
MSS025013A	Assist with assessing and monitoring wetlands	
MSS025014A	Perform sampling and testing of contaminated sites	*
MSS025015A	Plan and conduct environmental project work	
MSS025016A	Perform sampling and testing of stationary emissions	
MSL975011A	Design and supervise complex environmental field surveys	*
MSL975017A	Perform laboratory-based ecological techniques	*
MSL975023A	Supervise geotechnical site investigations	*
PRMWM01B	Plan waste audit	
PRMWM02B	Carry out waste audit	
PSPRAD707A	Monitor radiation	

Group C: Elective units

Unit code	**Unit title**	**P**
CUVPHI05B	Use a 35mm SLR camera or digital equivalent	
HLTFA301B	Apply first aid	
MSL935004A	Maintain instruments and equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973004A	Perform asceptic techniques	
MSL973007A	Perform microscopic examination	
MSL973012A	Assist with geotechnical site investigations	
PRMWM01B	Plan waste audit	
PRMWM02B	Carry out waste audit	
PSPRAD707A	Monitor radiation	

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PUAWER009B	Participate as a member of a workplace emergency initial response team	
TAEDEL301A	Provide work skill instruction	

Custom Content Section

Not applicable.

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MSS50111 Diploma of Sustainable Operations

Modification History

Not applicable.

Description

This qualification provides the skills and knowledge required to work in a technical, supervisory or operational role in sustainability in an organisation and/or it's value chain (e.g. suppliers of goods or services, or customers). The qualification has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The qualification packaging has been developed on an assumption that competency will be developed through a combination of on and off-the-job learning strategies.

Job roles/employment outcomes

The MSS50111 Diploma of Sustainability specifies the competencies required for employment in job roles related to assisting organisations to improve sustainability and to meet their obligations under sustainability related regulatory arrangements, government or similar incentives, or other initiatives that apply to their operations.

Employment outcomes related to this qualification may include specialist roles, such as a sustainability manager, or the qualification can provide specialist sustainability competencies to technical, supervisory or operational employees.

Application

This qualification provides sustainability skills that can be applied inside an organisation and its value chain. Examples include:

- manufacturing enterprises
- organisations in a value chain, such as:
  - suppliers
  - customers
  - distributors, warehouses, transport suppliers and other logistics support organisations
  - professional service suppliers to manufacturing, for example, legal, engineering, accounting and auditing suppliers
- sustainability consulting enterprises.
-

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Pathways Information

Pathways into the qualification

This qualification has no formal entry requirement due to the wide variety of sustainability applications in industry. However, most enterprises will expect technical skills relevant to their operations or equivalent vocational experience and for this reason the qualification is unlikely to be suitable for direct entry from school.

Pathways from the qualification

Further training pathways from this qualification include the MSS70111 Vocational Graduate Certificate in Sustainable Operations.

Additional qualification advice

This qualification provides the skills needed to measure current sustainability performance and to establish processes for improved sustainability performance within organisations. It complements but does not duplicate qualifications supplying technical skills related to engineering, chemical, environmental and other technical analyses that may be needed for improving sustainability. Where these skills are required appropriate qualifications from other Training Packages, such as the MEM05 Metal and Engineering, PMA08 Chemical, Hydrocarbons and Refining and MSA07 Manufacturing Training Packages, should be considered.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

This qualification has no formal entry requirement due to the wide variety of sustainability applications in industry.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Manage implementation sustainability improvement procedures and develop and distribute related information

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	• Develop standardised documentation on behalf of an area or group of work teams • Share and discuss information with others about enterprise activities • Develop and communicate workplace procedures • Provide information and clarifications to team leaders and other employees on workplace procedures in relation to sustainability • Provide and interpret instructions, specifications, standard operating procedures and other work-related documents • Provide assistance or information to relevant personnel • Debrief on workplace changes with relevant stakeholders • Record production, emissions and other work-related information • Access and use workplace communication tools and equipment • Apply numeracy skills to work procedures • Provide information about team activities to managers, supervisors and customers
Teamwork	• Identify roles of work teams where teamwork is used as the form of work organisation • Supervise and lead others in a production environment • Share work-related information with peers, including team members, supervisors and management • Identify hazards to employees and visitors • Identify the value chain and advise other employees as to how they can contribute to the final quality of the product • Review changes to work practices and work relationships with team leaders and other employees • Provide assistance with planning work operations as required • Seek assistance with work operations from specialists and other employees as required • Participate in multidisciplinary teams as required
Problem solving	• Monitor production and maintenance activities • Analyse inconsistencies, non-compliances, faults or hazards • Identify factors within work area that are a constraint to work efficiency or reaching of production outcomes • Identify essential and non-essential practices • Implement methods of increasing features/benefits of products or processes • Monitor responsibilities of teams and make improvements to work organisation • Identify process steps which cause a problem and implement improvement processes • Monitor sustainability performance and implement improvement processes

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	• Compare shift or area required performance with actual performance • Identify situations where compliance to specifications or safety standards is unlikely • Identify, recommend and implement improvements • Identify causes of identified faults and take appropriate action • Investigate causes of deviations from targets and standards in relation to sustainability • Undertake root cause analysis
Initiative and enterprise	• Manage procedures and systems for optimum outcomes • Analyse feedback on procedures and systems • Analyse problems, implications or suggestions for improvements • Adjust work activities according to changes in customer requirements • Identify methods of increasing contribution of work teams to sustainability • Identify and implement changes and improvements • Monitor processes and equipment to ensure cost efficiency • Implement and monitor work practices to reduce waste • Participate in multidisciplinary teams to develop new products or processes
Planning and organising	• Ensure work areas comply with sustainability obligations and requirements • Identify and manage processes, tools and materials • Implement improvements in accordance with procedures • Distinguish between essential and non-essential practices • Implement use of planning tools within work of teams • Determine and prioritise required actions • Collect, organise and analyse information from work activities • Monitor work activities according to safety and workplace standards • Set production targets and outcomes • Interpret data and information as required by own job • Ask questions to ensure there is understanding of work requirements in teams and among other employees
Self-management	• Recommend methods of increasing own contribution to the value chain • Adjust work processes according to procedures and customer requirements • Identify and manage impact of change in own work • Minimise waste in own work activity • Assess own work performance • Set personal objectives for work performance

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	• Manage own time
Learning	• Identify skill requirements of self and team members • Arrange skill development training for self and others • Adapt to changing work requirements • Ask questions to aid learning of others • Identify personal skill gaps and additional skill needs • Ask questions to ensure understanding of own work requirements • Monitor own work and identify areas for improvement • Seek feedback on work performance • Provide feedback on work performance to team leaders and team members
Technology	• Monitor technology to ensure sustainability according to legislative requirements and workplace standards • Identify equipment and processes appropriate for jobs and skill levels of employees • Provide appropriate equipment to ensure safety and efficiency according to skill levels of employees • Assess operational efficiency of technology within own skill level and that of team members • Analyse data and other information from equipment reports • Use information technology appropriate for job • Manage maintenance procedures appropriate to job and processes according to skill levels of team members

Packaging Rules

To be awarded the MSS50111 Diploma of Sustainable Operations, competency must be achieved in **twenty (20)** units of competency.

- **six (6)** core units of competency
- **fourteen (14)** elective units of competency, as specified below.

Note: Units with prerequisites are marked with an asterisk. Refer to the unit for details.

Core units of competency

- Complete the following **six (6)** units of competency.

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Unit code	Unit title	P
MSS015001A	Measure and report carbon footprint	
MSS015002A	Develop strategies for more sustainable use of resources	
MSS015007A	Develop a business case for sustainability improvements	
MSS015008A	Develop strategic sustainability plans	
MSS015009A	Implement sustainability plans	
MSACMT671A	Develop and manage sustainable environmental practices	

Elective units of competency

- Complete fourteen (14) units of competency, made up of:
  - a minimum of **seven (7)** units from Group A
  - a minimum of **three (3)** units from Group B
  - the balance of units, to a maximum of **four (4),** may be selected from:
    - Group A or B units, not previously selected
    - Group C elective units, listed below.

Group A: Specialist sustainability elective units

Unit code	Unit title	P
MSS014001A	Improve sustainability through readily implementable change	
MSS015003A	Analyse product lifecycle for sustainability	
MSS015004A	Design sustainable product or process	
MSS015005A	Develop required sustainability reports	
MSS015006A	Report to Global Reporting Initiative guidelines	
MSS015010A	Conduct a sustainability water audit	
MSS015011A	Conduct a sustainability energy audit	
MSS015012A	Conduct an emissions audit	
MSS015013A	Conduct a sustainability related transport audit	

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MSS015014A	Develop response to sustainability related regulation	
MSS015015A	Evaluate sustainability impact of a process	
MSS015016A	Implement and monitor reengineering for sustainability	
MSS015017A	Develop regulated sustainability reports	
MSS015018A	Inform and educate organisation and community representatives on sustainability issues	
MSACMT670A	Develop and manage sustainable energy practices	
PMASUP520B	Review procedures to minimise environmental impact of process	
PMASUP620B	Manage environmental management system	

Group B: Elective units

Unit code	**Unit title**	**P**
MSS025001A	Assist with assessing site environmental indicators	*
MSS025002A	Assess the environmental risk or impact of a project activity or process	*
MSACMC610A	Manage relationships with non-customer external organisations	
MSACMC611A	Manage people relationships	
MSACMC612A	Manage workplace learning	
MSACMC613A	Facilitate holistic culture improvement in a manufacturing enterprise	
MSACMC614A	Develop a communications strategy to support production	
MSACMS600A	Develop a competitive manufacturing system	
MSACMS601A	Analyse and map a value chain	*
MSACMS602A	Manage a value chain	*
MSACMS603A	Develop manufacturing related business plans	

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MSACMT452A	Apply statistics to processes in manufacturing	
MSACMT620A	Develop quick changeover procedures	
MSACMT621A	Develop a Just in Time (JIT) system	*
MSACMT631A	Undertake value analysis of product costs in terms of customer requirements	*
MSACMT632A	Analyse cost implications of maintenance strategy	
MSACMT640A	Manage 5S system in a manufacturing environment	
MSACMT641A	Implement a continuous improvement system	
MSACMT650A	Determine and improve process capability	*
MSACMT660A	Develop the application of enterprise systems in manufacturing	
MSACMT661A	Determine and establish information collection requirements and processes	
MSACMT662A	Develop a documentation control strategy for a manufacturing enterprise	
MSACMT675A	Facilitate the development of a new product	*
MSACMT681A	Develop a proactive maintenance strategy	
MSAENV672B	Develop workplace policy and procedures for sustainability	
MSAPMOHS510A	Manage risk	

Group C: Elective units

Unit code	**Unit title**	**P**
MSS024003A	Apply an understanding of environmental principles to a site	
MSACMC410A	Lead change in a manufacturing environment	
MSACMS400A	Implement a competitive manufacturing system	
MSACMT230A	Apply cost factors to work practices	
MSACMT260A	Use planning software systems in manufacturing	

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MSACMT261A	Use SCADA systems in manufacturing	
MSACMT280A	Undertake root cause analysis	
MSACMT423A	Monitor a manufacturing levelled pull system	
MSACMT451A	Mistake proof a production process	
MSACMT453A	Use six sigma techniques	*
MSACMT460A	Facilitate the use of planning software systems in manufacturing	*
MSACMT481A	Undertake proactive maintenance analyses	
MSAPMSUP390A	Use structured problem solving tools	
A maximum of **four (4)** elective units may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are available at Diploma level. Units chosen should be relevant to the workplace and would normally be drawn from the appropriate sector Training Package, or possibly the Business Services Training Package.		

Custom Content Section

Not applicable.

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MSS50211 Diploma of Environmental Monitoring and Technology

Modification History

Not applicable.

Description

This qualification covers the skills and knowledge required to apply a range of methods and technologies to conduct environmental sampling, testing and monitoring in most industry sectors and to assist environmental scientists, engineers and planners with site assessment, minimising environmental impacts of processes and remediation/rehabilitation of sites.

Job roles/employment outcomes

The MSS50211 Diploma of Environmental Monitoring and Technology provides technical training across a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, odour, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation and rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Job roles targeted by this qualification include environmental officers, environmental protection officers, environmental compliance officers, environmental technicians and similar personnel employed by enterprises and Commonwealth, state/territory/local governments in the sectors listed above. These personnel often work with environmental scientists, engineers, planners and community groups to manage and conserve natural systems and resources, minimise pollution, remediate/rehabilitate sites and trial practical strategies to protect and improve ecosystems. Their work often involves environmental monitoring and technology, internal auditing and continuous improvements to enhance compliance and minimise the environmental impacts of processes. Government employees may be more involved with external inspection and auditing of enterprises and negotiating appropriate responses to instances of non-compliance.

In broad terms, they may:

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- plan and schedule work and project activities (e.g. inspections and field surveys) and determine equipment, materials and consumable requirements
- develop site or field plans/instructions for specific environmental management activities
- assist with the design of environmental monitoring programs for sites/areas
- contribute to the assessment of environmental impacts of development and human activities
- undertake part or total ecological studies for a site
- conduct site inspections and full or part environmental audits of processes
- conduct field surveys of flora, fauna, water and soils
- collect samples/specimens, such as air, odour, water, groundwater, waste, soil residues, noise, biological, microbiological and geological
- set up, test, conduct calibration checks and operate a wide range of environmental monitoring equipment, field test instruments, data loggers, and/or remote sensing stations
- troubleshoot, repair, maintain and/or adapt instrumentation
- conduct tests/measurements involving air, odour, water, groundwater, waste, soil residues, noise, microbiological, geological and meteorological samples
- collect, process and present spatial/attribute data using global positioning systems (GPS) and geographical information systems (GIS)
- analyse data to identify trends, unexpected results and report conclusions
- provide environmental management information to site personnel, enterprises, industry organisations and communities
- provide environmental management information to site personnel and community members
- conduct technical training and work skill instruction
- suggest strategies to minimise environmental impacts and for the remediation or rehabilitation of sites/areas
- explain inspection/audit findings, negotiate outcomes with enterprise representatives, and issue notices, as necessary
- prepare costings and proposals, manage the finances for small projects, and report and present project progress and outcomes.

Application

This qualification is typically used to prepare new employees or develop the skills of existing workers performing an environmental officer role in most industry sectors.

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

Pathways Information

Pathways into the qualification

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This qualification may be accessed by direct entry. Credit may be granted towards this qualification by those who have completed the MSL20109 Certificate II in Sampling and Measurement or the MSS40211 Certificate IV in Environmental Monitoring and Technology. Credit for this qualification may include units contained within relevant Skill Sets.

Pathways from the qualification

Further training pathways from this qualification include qualifications in the higher education sector and the MSS70211 Vocational Graduate Certificate in Environmental Management.

Career paths for environmental technicians are becoming increasingly constrained unless they undertake university study. With this in mind, particular attention has been given to stating the critical aspects of competency and essential knowledge required for each unit of competency in sufficient detail to maximise articulation and credit transfer arrangements between the vocational education and training (VET) and higher education sectors.

Additional qualification advice

Because specialisation is a requirement in some industry sectors for the Diploma, Registered Training Organisations (RTOs) may choose to issue a generic:

- Diploma of Environmental Monitoring and Technology

or, where elective units of competency are packaged to suit a particular industry sector or specialisation, RTOs may choose to issue a:

- Diploma of Environmental Monitoring and Technology (specialising in xxxxxxx)

Industry sector/specialisations could include, but are not limited to:

- water
- air
- odour
- soil
- noise.
-

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

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Entry Requirements

This qualification may be accessed by direct entry.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Communication	• Communicate appropriately with site personnel and community members in order to respond effectively to requests for environmental information • Write procedures using an unambiguous, logical sequence of instructions that meet statutory and regulatory requirements • Record and store data, perform calculations of scientific quantities and present information in maps, diagrams, tables and graphs • Report using verbal responses, data entry into the enterprise information management system and brief written reports • Contribute information to reports for clients • Liaise with contractors, consultants, community representatives, regulator representatives and members of the public
Teamwork	• Work effectively with team members who may have diverse work styles, cultures and perspectives when reporting problems, hazards and environmental incidents and results or contributing to system improvements • Promote cooperation and good relations in the team
Problem solving	• Adjust sampling/monitoring procedures or substitute alternative instruments and measurement standards to suit local site conditions (but within scope of responsibility/technical competence) • Recognise potential or actual environmental management non-conformances, assess their significance and recommend preventative or corrective actions • Apply specialised technical knowledge to critically analyse and resolve complex problems and non-conformances where solutions are not obvious or readily available • Troubleshoot sampling/monitoring equipment and instruments in the field and make basic repairs
Initiative and enterprise	• Recommend appropriate preventative/corrective actions to improve sampling, field testing and/or monitoring activities • Identify hazards associated with samples, sample collection methods, reagents and equipment and implement enterprise

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	control measures • Research current, alternative sampling/monitoring methods and equipment • Research environmental monitoring and management case studies and models of good practice • Suggest improvements in productivity and quality
Planning and organising	• Plan surveys and field studies • Identify, assemble, check and stow all required field equipment and materials for safe transport • Modify work plans to suit changing conditions and priorities • Assemble, organise, check and optimise monitoring equipment for specific sites or use • Plan work sequences to optimise efficiency without sacrificing quality
Self-management	• Communicate in an efficient and polite manner, taking into account cultural diversity and disabilities and the wide range of views that stakeholders may have about environmental issues • Follow enterprise procedures which reflect equal opportunity, anti-discrimination and non-harassment legislative requirements • Conduct work based on ethical values and principles and ensure quality and integrity of own work • Review own strengths, weaknesses and work practices for opportunities to continuously improve performance • Maintain security and confidentiality of all client/enterprise data and information • Regularly (re)assess risks; step back and consider options; and use controls, safe work procedures and appropriate personal protective equipment to ensure personal safety
Learning	• Seek and respond to feedback from supervisor and other site personnel about performance • Update knowledge and skills and take advantage of skill development opportunities • Provide information to other site personnel about their environmental management obligations
Technology	• Select and use computers and software to collect, process, present, report and/or store information • Select, use and optimise sampling and monitoring equipment, field-test instruments, data loggers and/or remote sensing equipment

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Packaging Rules

To be awarded the MSS50211 Diploma of Environmental Monitoring and Technology, competency must be achieved in a total of **twenty (20)** units of competency.

- **eleven (11)** core units of competency
- **nine (9)** elective units of competency, as specified below.

Units listed under **core** are considered essential for all environmental officers. The units listed as **electives** may only apply to some personnel according to the size and scope of the particular enterprise and industry sector.

Note: Units with prerequisites are marked with an asterisk. Refer to the unit for details.

Core units of competency

- Complete the following **eleven (11)** units of competency.

Unit code	Unit title	P
MSS024002A	Implement environmental management plans and procedures	
MSS024003A	Apply an understanding of environmental principles to a site	
MSS024004A	Process and present environmental data	
MSS025001A	Assist with assessing site environmental indicators	*
MSS025002A	Assess the environmental risk or impact of a project activity or process	*
MSS025003A	Report environmental data	*
MSS025004A	Provide environmental information to customers	
MSAENV472B	Implement and monitor environmentally sustainable work practices	
MSL943002A	Participate in laboratory/field workplace safety	
MSL952001A	Collect routine site samples	
MSL974007A	Undertake environmental field-based monitoring	

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Elective units of competency

- Complete **nine (9)** elective units of competency, made up of:
- a minimum of **five (5)** units from Group A
- the balance of units, to a maximum of **four (4)**, may be selected from:
- Group A units, not previously selected
- Group B and C units, listed below, with a maximum of **three (3)** units from Group C.

A maximum of **four (4)** Group B and C electives may be selected from this Training Package, other endorsed Training Packages and accredited courses, where those units are relevant and available at Diploma level and above. **This could include relevant units available in AHC10 Agriculture, Horticulture and Conservation and Land Management Training Package.**

Group A: Specialist elective units

Unit code	Unit title	P
MSS015001A	Measure and report carbon footprint	
MSS015010A	Conduct a sustainability water use audit	
MSS015011A	Conduct a sustainability energy audit	
MSS015012A	Conduct an emissions audit	
MSS015018A	Inform and advise organisation and community representatives on sustainability issues	
MSS025005A	Produce site maps	*
MSS025006A	Collect and evaluate groundwater data	
MSS025007A	Perform sampling and testing of soils	*
MSS025008A	Monitor and evaluate noise	
MSS025009A	Perform sampling and testing of air	
MSS025010A	Assist with odour source assessment	
MSS025011A	Assist with odour field assessment	
MSS025012A	Perform environmental microbiological tests	*

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MSS025013A	Assist with assessing and monitoring wetlands	
MSS025014A	Perform sampling and testing of contaminated sites	*
MSS025015A	Plan and conduct environmental project work	
MSS025016A	Perform sampling and testing of stationary emissions	
MSL975011A	Design and supervise complex environmental field surveys	*
MSL975017A	Perform laboratory-based ecological techniques	*
MSL975023A	Supervise geotechnical site investigations	*
PRMWM01B	Plan waste audit	
PRMWM02B	Carry out waste audit	
PSPRAD707A	Monitor radiation	

Group B: Elective units

Unit code	**Unit title**	**P**
MSS014006A	Contribute to sustainability related audits	
MSS024001A	Work and communicate effectively as an environmental technician	
MSS024005A	Collect spatial and discrete environmental data	
MSS024006A	Perform sampling and testing of water	
MSS024007A	Collect and evaluate meteorological data	
MSS024008A	Recognise common geological landforms and samples	
MSS024009A	Assist with assessing and monitoring stormwater systems	
MSS024010A	Perform environmental biological techniques	
MSS024011A	Navigate in urban, regional and remote areas	
MSS024012A	Undertake simple environmental project activities	
BSBOHS406C	Use equipment to conduct workplace monitoring	

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MSL904001A	Perform standard calibrations	
MSL924002A	Use laboratory application software	
MSL954001A	Obtain representative samples in accordance with sampling plan	
MSL974002A	Conduct geotechnical site investigations	*
MSL974003A	Perform chemical tests and procedures	
MSL974006A	Perform biological procedures	*
MSL974009A	Undertake field-based, remote sensing monitoring	
PSPRAD703A	Perform basic radiation measurements	

Group C: Elective units

Unit code	**Unit title**	**P**
CUVPHI05B	Use a 35mm SLR camera or digital equivalent	
HLTFA301B	Apply first aid	
MSAENV272B	Participate in environmentally sustainable work practices	
MSL935004A	Maintain instruments and equipment	
MSL973001A	Perform basic tests	
MSL973002A	Prepare working solutions	
MSL973004A	Perform asceptic techniques	
MSL973007A	Perform microscopic examination	
MSL973012A	Assist with geotechnical site investigations	
PRMWM01B	Plan waste audit	
PRMWM02B	Carry out waste audit	
PSPRAD707A	Monitor radiation	
PUAWER009B	Participate as a member of a workplace emergency initial response team	

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TAEDEL301A	Provide work skill instruction	

Custom Content Section

Not applicable.

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MSS70111 Vocational Graduate Certificate in Sustainable Operations

Modification History

Not applicable.

Description

This qualification provides professional development training and recognition to people exercising leadership or change management functions in an organisation on sustainability, including setting of sustainability strategy and leadership and planning for the deployment of the sustainability strategy.

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 and that the learner has access to a workplace for projects.

Job roles/employment outcome

The MSS70111 Vocational Graduate Certificate in Sustainable Operations provides professional development for individuals who already have some previous training or work experience in sustainability systems and processes. It is not an entry level qualification in sustainability. In particular the qualification assumes that learners are already familiar with the basic concepts of sustainability (e.g. triple bottom line, concept of emissions, carbon and carbon equivalence, environmental impact, and so on) and are also familiar with the operations and processes used within their organisation.

Application

The qualification applies to individuals who have responsibility at a strategy level for improving sustainability within an organisation. Aspects of this responsibility may include regulatory responses, setting and monitoring of sustainability related performance indicators, liaison with stakeholders including shareholders, employees, value chain members and the local and general community. Target groups include supervisors, managers and technical experts responsible for implementing sustainability improvement strategies and practices in their organisation and/or all or part of the value chain.

The qualification has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

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Pathways Information

Not applicable.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

Entrants to the MSS70111 Vocational Graduate Certificate in Sustainable Operations should have one or more of the following:

- Advanced Diploma or Diploma in a sustainability related discipline or relevant technical field, or a relevant Certificate IV or Certificate III together with significant relevant vocational practice in a relevant technical field,
- a Bachelor Degree in a relevant technical field
- another relevant higher education qualification, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

Entrants for the qualification should also possess operational or technical skills related to the organisation seeking sustainability improvements either through prior experience or previous study.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Communication	• Consult with internal and external stakeholders on sustainability strategy • Communicate processes and goals to managers, other employees and members of the value chain • Use interpersonal and language skills to encourage collaboration • Identify new improvement opportunities through discussion with internal and external stakeholders
Teamwork	• Cultivate collaboration and participation in change processes • Meet with stakeholders to resolve problems • Establish support and ownership among stakeholders for future sustainability objectives

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Problem solving	• Collect, analyse and interpret data • Determine root causes of non-conformances • Evaluate options for improvements to sustainability performance across the organisation • Analyse effects of potential and actual equipment failures
Initiative and enterprise	• Ensure data collection and feedback mechanisms are established for all change implementation processes • Provide leadership during major non-conformances • Identify and implement process improvements • Use analytical and decision making skills to prioritise improvement activities
Planning and organising	• Identify data requirements to determine current and future states • Organise data collection systems • Establish team responsibilities for implementation of change • Plan change implementation strategy and identify risk factors
Self-management	• Manage own time and establish own work schedule • Monitor and evaluate own work quality • Maintain professional and ethical standards in own work • Comply with legislative requirements, codes of practice and organisational policies and procedures
Learning	• Identify opportunities for individual and organisational learning • Use feedback from others to establish improvement processes • Record learning according to organisational procedures • Ensure stakeholders are able to access and apply relevant knowledge/learning
Technology	• Analyse systems and technology implications of change options • Implement procedures to monitor and record equipment availability, performance and availability • Determine systems compatibility with other members of the value chain • Use record keeping equipment and programs

Packaging Rules

To be awarded the MSS70111 Vocational Graduate Certificate in Sustainable Operations competency must be achieved in **five (5)** units of competency.

- **two (2)** core units of competency
- **three (3)** elective units of competency, as specified below

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Note: None of the units listed in this qualification have prerequisites.

Core units of competency

- Complete the following **two (2)** units of competency.

Unit code	Unit title
MSS017001A	Analyse and determine organisational risk areas in sustainability
MSS017004A	Lead sustainable strategy deployment

Elective units of competency

Complete **three (3)** elective units of competency, made up of:

- a minimum of **two (2)** units from Group A
  - the balance of **one (1)** elective unit, may be selected from:
    - Group A units, not previously selected
    - Group B elective units, listed below.

Group A: Elective units

Unit code	Unit title
MSS017002A	Determine process loss through mass or energy balancing
MSS017003A	Identify and respond to external sustainability factors for an organisation
MSS017005A	Manage a major sustainability non-conformance
MSS017006A	Identify and improve sustainability interactions relations with the community
MSS017007A	Design for sustainability
MSS027002A	Apply environmental legislation, codes and standards
MSACMG712A	Lead a problem solving process to determine and solve root cause

Group B: Elective units

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Unit code	Unit title
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
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
MSACMG800A	Analyse data for relevance to organisational learning
MSACMG801A	Develop the competitive manufacturing approach
MSACMG802A	Audit the use of competitive tools
MSAENV672B	Develop workplace policy and procedures for sustainability
One (1) elective unit may be selected from this Training Package, other endorsed Training Packages and accredited courses, where that unit is available at Vocational Graduate Certificate and Vocational Graduate Diploma level.	

Custom Content Section

Not applicable.

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MSS70211 Vocational Graduate Certificate in Environmental Management

Modification History

Not applicable.

Description

This qualification covers the skills and knowledge required by technical specialists who already have a relevant higher education or vocational qualification, or have extensive vocational experience without formal qualifications and require the competence to coordinate environmental monitoring and management activities at a site, or for a significant environmental management program or project.

This qualification was developed in response to a widespread industry shortage of technicians and (para) professionals who have the detailed knowledge and practical skills required to oversee day-to-day environmental monitoring and management programs and remediation or rehabilitation activities. It has strong industry support.

Job roles/employment outcomes

The MSS70211 Vocational Graduate Certificate in Environmental Management provides training in advanced environmental monitoring, technology and data analysis techniques for individuals who have some previous training or work experience in environmental monitoring and technology at AQF V or higher. Job roles targeted by this qualification include environmental site coordinators, environmental managers and senior environmental officers employed by enterprises/authorities in a wide range of industry sectors, such as:

- environmental monitoring and management services (e.g. air, water, soil and noise)
- environmental compliance, auditing and inspection
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency consultancy (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

The specific job role of personnel will depend on whether they are employed in the private or public sector and which industry sector. They may individually, or as part of a team:

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- interpret and implement environmental monitoring, management and/or sustainability policies, plans and strategies for sites, catchment areas and regions
- plan, resource and execute a wide range of environmental management activities (e.g. sampling, monitoring, impact/risk assessments, remediation and rehabilitation) for sites, catchment areas and regions
- undertake complex environmental management project work
- monitor legislative requirements and develop responses on behalf of the enterprise/authority
- ensure enterprise legislative compliance through performance monitoring and auditing
- process, verify and analyse monitoring data
- develop and trial environmental management options
- liaise with regulatory bodies about permits, approvals and compliance matters
- liaise with local stakeholders, contractors and consultants about environmental issues and/or technical matters
- present environmental information to clients and members of the community
- contribute to environmental decision making
- provide information and training to site personnel (e.g. environmental management obligations and responsibilities, specific sampling/monitoring methods and instrument use)
- develop, implement and improve procedures and work instructions for enterprise personnel who conduct, sampling, field testing, hazard control, waste minimisation, site remediation and environmental audits/inspections
- define and solve complex problems by investigating, developing and/or testing alternatives that may involve incomplete or ill-defined information
- contribute to improving enterprise/authority environmental performance
- prepare costings and proposals, and manage project finances
- report environmental performance and the progress and outcomes of projects within broad scope of accountability.

Environmental site coordinators, environmental managers and senior environmental officers require a detailed knowledge of the environmental management policies and legislative requirements that are relevant to their enterprise or authority's business activities and must be able to explain these to other site personnel. They require highly specialised knowledge of environmental monitoring methods, instrumentation and processing of large data sets. They must also understand the complexity of industry processes and/or ecosystems that they are working with; the likely environmental impacts of development and human activities (e.g. air, soil, noise, water and resource use); as well as strategies for minimising these impacts and the remediation or rehabilitation of sites/areas. They need well developed operational planning and complex problem-solving skills, supervision and communication skills along with liaison, negotiation skills and report writing skills. They work under broad direction from environmental scientists, engineers and planners.

Application

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This qualification applies to environmental site coordinators, environmental managers and senior environmental officers who oversee environmental monitoring and management activities at a site or for a significant environmental management program or project.

Pathways Information

Not applicable.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification. However, depending on the jurisdiction, licensing or regulatory requirements may apply to the use of some units in this qualification. Local regulations should be checked for details.

Entry Requirements

Entrants to the MSS70211 Vocational Graduate Certificate in Environmental Management are required to have one of the following:

- relevant extensive vocational practice without formal qualifications
- a relevant Diploma, such as MSS50211 Diploma of Environmental Monitoring and Technology, together with significant relevant vocational practice
- a Bachelor Degree in Environmental Management, Environmental Science or Science in a relevant discipline, such as chemistry, ecology or geology
- a relevant higher education qualification, with relevant vocational practice.

For the purposes of this qualification, the term ‘vocational practice’ is defined as performing a wide range of environmental sampling, monitoring, field-testing, inspection/auditing and/or data processing tasks for enterprises in any of the industry sectors listed above.

Employability Skills Summary

The following table contains a summary of the employability skills as identified by industry for this qualification. This table should be interpreted in conjunction with the detailed requirements of each unit of competency packaged in this qualification. The outcomes described here are broad industry requirements that reflect skill requirements for this level.

Employability Skill	**Industry/enterprise requirements for this qualification include:**
Communication	• Liaise with local stakeholders, contractors and consultants about complex environmental issues and/or technical matters • Liaise with regulatory bodies about permits, approvals and compliance matters • Present environmental information to clients and members of the

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	community • Liaise with suppliers about technical matters (e.g. equipment, samples and laboratory test results) • Interpret complex sampling, monitoring and test methods and environmental management procedures • Explain environmental management responsibilities and specified management actions to site personnel • Prepare complex technical reports and contributions to major project documents • Obtain sign-off for results and/or outputs from relevant persons
Teamwork	• Work autonomously or as part of a team • Contribute to complex risk/impact assessment studies and environmental decision making • Contribute to developing and/or validating sampling, monitoring and field testing procedures • Contribute to improving environmental performance at sites
Problem solving	• Analyse and solve coordination problems to improve the effectiveness and efficiency of day-to-day environmental management activities • Investigate data quality issues • Determine root causes of problems with sampling, monitoring and/or field-testing procedures and/or instrument performance • Evaluate options for improving environmental performance and quality, including corrective and/or preventative actions
Initiative and enterprise	• Research current and new environmental management case studies or technical developments and assess their significance for the site, project, program or own job role • Network with other technical specialists to extend personal knowledge • Recognise opportunities improving environmental performance and quality and recommend improvement strategies
Planning and organising	• Prioritise, plan and coordinate environmental management activities • Determine resource requirements for activities, projects, programs and organise/optimise resource use in work area • Organise schedules to optimise work outputs without sacrificing quality • Adjust plans to suit new information, changing conditions and priorities
Self-management	• Manage own time and establish own work schedule • Monitor and evaluate own work quality • Maintain professional and ethical standards in own work • Comply with legislative requirements, codes of practice and organisational policies and procedures

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Learning	• Identify opportunities for continuing learning and development • Maintain knowledge of environmental issues, current management strategies and new developments in environmental monitoring instruments and techniques relevant to job role
Technology	• Set up and optimise sampling, monitoring and field-testing instruments/equipment to obtain reliable results • Conduct routine maintenance of monitoring instruments used in job role and conduct straightforward repairs • Use instrument control software, enterprise information management systems, information directories, databases, online data search facilities and computer networks

Packaging Rules

To be awarded the MSS70211 Vocational Graduate Certificate in Environmental Management, competency must be achieved in a total of **twelve (12)** units of competency.

- **five (5)** core units of competency
- **seven (7) elective units of competency, as specified below.**

The **core** units listed below are considered to be essential for all environmental site coordinators, environmental managers and senior environmental officers. The units listed as **electives** may only apply to some personnel according to the size and scope of their particular enterprise and the industry sectors that they work in.

Note: Units with prerequisites are marked with an asterisk. Refer to the unit for details.

Core units of competency

- Complete all **five (5)** of the following units of competency.

Unit code	Unit title	P
MSS027001A	Coordinate environmental management activities	
MSS027002A	Apply environmental legislation, codes and standards	
MSS027003A	Provide environmental advice to clients	
MSAENV472B	Implement and monitor environmentally sustainable work practices	

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MSL944001A	Maintain laboratory/field workplace safety	

- **Elective units of competency**

- Complete seven (7) elective units of competency, made up of:
  - a minimum of **three (3)** units from Group A
  - the balance of units, to a maximum of **four (4)**, may be selected from:
    - Group A units, not previously selected
    - Group B units, listed below.

Group A: Elective units

Unit code	**Unit title**	**P**
MSS027004A	Contribute to environmental decision making	
MSS027005A	Contribute to improving environmental performance	
MSS027006A	Coordinate water quality management activities	*
MSS027007A	Coordinate air quality management activities	*
MSS027008A	Coordinate noise management activities	*
MSS027009A	Coordinate site remediation or rehabilitation activities	*
MSS027010A	Undertake complex environmental project work	
MSS027011A	Select, commission and maintain environmental monitoring instruments	
MSS027012A	Implement and monitor the site OHS management system	*
MSAENV672A	Develop workplace policy and procedures for sustainability	
BSBOHS605B	Apply occupational hygiene principles to control OHS risk	
LGAPLEM506A	Improve community knowledge and skills in environmental management practices	
PUAWER010B	Lead a workplace emergency initial response team	
RIINHB408A	Supervise environmental drilling operations	

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RIIPRM501A	Implement, monitor, rectify and report on contracts	

Group B: Elective units

Unit code	Unit title	P
MSS015005A	Develop required sustainability reports	
MSS015018A	Inform and advise organisation and community representatives on sustainability issues	
MSS025005A	Produce site maps	*
MSS025006A	Collect and evaluate groundwater data	
MSS025007A	Perform sampling and testing of soils	*
MSS025008A	Monitor and evaluate noise	
MSS025009A	Perform sampling and testing of air	
MSS025010A	Assist with odour source assessment	
MSS025011A	Assist with odour field assessment	
MSS025013A	Assist with assessing and monitoring wetlands	
MSS025014A	Perform sampling and testing of contaminated sites	*
MSS025016A	Perform sampling and testing of stationary emissions	
MSS024005A	Collect spatial and discrete environmental data	
MSS024006A	Perform sampling and testing of water	
MSS024007A	Collect and evaluate meteorological data	
MSS024008A	Recognise common geological landforms and samples	
MSS024009A	Assist with assessing and monitoring stormwater systems	
MSL974007A	Undertake environmental field-based monitoring	
MSL974009A	Undertake field-based, remote sensing	
MSL975011A	Design and supervise complex environmental field surveys	*

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PSPRAD707A	Monitor radiation	
A maximum of **two (2)** Group B units may be chosen from this Training Package, other endorsed Training Packages and accredited courses, where those units are available at Diploma level and above.		

Custom Content Section

Not applicable.

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MSS014001A Improve sustainability through readily implementable change

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers identifying and implementing readily implementable changes to production or operation procedures to improve sustainability in an organisation or related value chain (e.g. supplier of goods or services or customer) organisations.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit covers the identification and implementation of changes to operational procedures to improve sustainability. These changes can often be attempted without substantial prior analysis or planning and are often characterised by the colloquial term as ‘low hanging fruit’.

This unit applies to employees with work area responsibilities such as team leaders, maintenance staff, technicians and others who have some sustainability responsibility as part of their job.

Measurements covered by this unit are related to measuring the immediate impact of changes on the equipment or area of operation.

The measurement of emissions or other environmental impact is not covered by this unit, although the use of relevant data arising from such measurements may be appropriate.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Examine sustainability outcomes required	1.1 Identify drivers of sustainability change
	1.2 Define sustainability problem or need
	1.3 Consult with stakeholders on a range of possible ways of satisfying the need
	1.4 Agree possible acceptable outcomes with key stakeholders
2 Examine operations for readily implementable changes to improve sustainability	2.1 Identify current operational and maintenance standard procedures
	2.2 Identify potential sustainability issues in process
	2.3 Short-list potential sustainability issues which may be able to be easily eliminated or improved
	2.4 Rank short-listed sustainability issues by estimated benefit/cost
	2.5 Determine success factors to assess benefits of eliminating waste
3 Implement improvements	3.1 Develop implementation plan to deliver required outcomes
	3.2 Negotiate required resources with relevant stakeholders
	3.3 Negotiate timelines and measures/indicators of success with change stakeholders
	3.4 Acquire and deploy resources required to achieve agreed outcome
	3.5 Monitor implementation and take action as required to achieve required outcome
	3.6 Renegotiate with relevant stakeholders as necessary

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4 Recommend further improvements	4.1 Measure improvements actually obtained
	4.2 Identify non-compliances with planned improvements
	4.3 Determine additional improvements desirable

Required Skills and Knowledge

Required knowledge includes:

- value chain concept and value chain participants to work area and the organisation more generally
- value chain items where changes can be made
- concept of waste used in lean manufacturing (i.e. muda and the seven wastes)
- brainstorming techniques
- benefit/cost analyses techniques
- methods of quantifying both required outcomes and muda into comparable units of measure
- project improvement planning/scheduling
- process monitoring and critical measures
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- negotiating with employees, including operators, maintenance personnel, office, warehouse and other support staff, contractors, suppliers and customers personnel, to identify easy to implement changes
- analysing standard operational procedures for opportunities for sustainability improvement opportunities and then to implementing the identified changes to operational procedures
- planning out changes to procedures
- solving problems related to implementing readily implementable sustainability changes in a work area
- communicating with stakeholders

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to consistently apply sustainability concepts to a work area and identify opportunities for sustainability improvements and then implement the improvements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • defining a sustainability related need or problem within current operations • identifying waste • identifying readily implemented changes • planning and implementing readily implemented changes to achieve a sustainability related improvement.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sustainability issues	Sustainability issues at this level will frequently be waste (muda – see below) but may also include community or other issues
Waste	Waste in this unit is used in the broader sense of 'muda' as used in lean manufacturing and the competitive manufacturing units of competency developed by MSA. Muda is usually summarised under the headings of the 'seven wastes' which include: • overproduction • delay/waiting • transportation • over processing • excess inventory • unnecessary motion • defects and rework
Documentation	Documentation includes: • standard operational procedures • engineering drawings • other sketches and diagrams • specifications and manuals • training and assessment manuals Documentation may be in: • any form, paper or electronic
Drivers of change	Drivers of change for this unit are internal or external pressure or requirements for improved sustainability outcomes. These include: • a crisis related to current sustainability performance • regulatory requirements • demands from customers • community pressure • organisation commitment to improve sustainability • other demand for change on the organisation
Sustainability problems	Sustainability problems may include: • problems with procedures, process or equipment • problems with materials including material waste and disposal of waste materials • problems with energy consumption • problems with resource use including water • problems with culture or employee skills and knowledge

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	• problems with design or specification Problems should be amenable to change and not require detailed technical analysis before action
Process	Process includes: • all parts of the value chain, including office and logistics, but for the purposes of this unit, is restricted to those parts of the value chain where changes can be made
Change stakeholders	Change stakeholders include: • the personnel needed to identify, approve and implement sustainability improvements

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS014002A Evaluate sustainability impact of a work or process area

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers evaluating the impact on sustainability of a work or process area or a stage of production or logistics. This may be undertaken as a stand alone evaluation or as part of an overall evaluation of an entire process or a value chain.

Application of the Unit

This unit applies inside organisations and their value chains. It typically applies to only a portion of a value chain. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to processes in non-manufacturing parts of organisations and other types of organisations.

This unit applies to establishing the overall or broad sustainability impact of processes undertaken in a work area and making recommendations for mitigating negative sustainability impacts. The unit scope includes evaluating the impact on products made, services offered, and use of sites by an organisation or manufacturing value chain member, such as a contractor. This unit covers only that portion of the value chain which is totally within the boundaries of the selected work area. For entire value chains or value chains outside the boundaries of the organisation, consider MSS015015A Evaluate sustainability impact of a process.

This unit applies to employees with work area responsibilities, such as team leaders, maintenance staff, technicians and others who have some sustainability responsibility as part of their job.

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Evaluate the work or process area	1.1 Identify the boundaries of the process or work area to be evaluated
	1.2 Identify all process steps within this area
	1.3 Identify the change which occurs at each step
	1.4 Define sustainability interactions at each step
2 Determine sustainability issues for the work or process area	2.1 Identify sustainability goals of enterprise as they relate to the process or work area
	2.2 Identify environmental sensitivities at each step in the process or work area
	2.3 Identify other sustainability issues at each step in the selected portion of the value chain
	2.4 Short-list high priority sustainability issues
3 Analyse sustainability issues for the work or process area	3.1 Determine root cause of each short-listed sustainability issue
	3.2 Determine possible solutions to root causes
	3.3 Estimate resources required for solutions and alternative mitigation strategies
	3.4 Rank possible solutions strategies by desirability
	3.5 Recommend preferred solutions in accordance with organisational procedures and protocols

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Required Skills and Knowledge

Required knowledge includes:

- process mapping with regard to sustainability
- process and changes which occur within the process
- environmental impacts of materials and energy used/emitted
- environmental sensitivities of all areas impacted by the work/process area (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- mitigation strategies as relevant to work/process area
- simple benefit/cost analyses techniques
- sustainability issues relevant to the work/process area
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- identifying sustainability goals of the enterprise and identifying implications for process or work area
- analysing and prioritising sustainability related issues
- liaising and discussing with stakeholders on possible solutions and strategies for sustainability improvement
- using problem solving techniques, including root cause analysis
- process mapping the process area

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate a work area, identify the sustainability issues and propose a range of solutions and strategies to improve sustainability.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying steps in the process and portion of manufacturing value chain • determining ecological and sustainability impacts of processes • determining root causes of impacts • evaluating solution and mitigation strategies.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any manufacturing, logistics, administrative, information technology or business process which may be in a manufacturing value chain
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Environmental sensitivities	Environmental sensitivities may include: • fragile areas, rare or threatened species • heritage or cultural sensitivity issues • hazardous emissions • regulated emissions or other regulatory issues • community perceptions or other issues • other issues, such as those identified in ISO 14001 Environmental Standards
Priority rankings	Priority rankings may include: • issues of high impact and high probability of occurrence • issues aligned to organisations strategic direction • issues related to regulatory requirements
Determine	Determining may include: • developing solutions within the scope of skill • discussing issues with relevant experts to develop a solution • undertaking research (literature or physical) within the scope of skill to develop a solution

Sustainability issues	Sustainability issues (as relevant to the work/process area) may include:
	• need to reduce the carbon footprint of product and process through reduction in use of:
	  • energy
	  • water
	  • raw materials
	  • emissions
	  • embedded carbon in transport, storage, rework and errors, inefficient processes and design, and general facility efficiencies

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	Sustainability related issues may also exist irrespective of the carbon equivalence aspects of the issue. This may include:
	• current and future availability of raw materials
	• current and future availability of energy
	• extent and type of waste generation and disposal
	• efficiency of process in terms of consumption of materials and energy regarded as in short supply or which are regarded as environmentally sensitive
	• the extent to which the production process, product and waste affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, proximity to schools, religious facilities, and impact on local residents and infrastructure)
	• extent of regulatory oversight and extent and cost of compliance
	• AS/NZS ISO 14000 Environmental Management Standards
	• consumer demand for more sustainable products and processes
	• ethical supply chain

Desirability ranking	Desirability ranking includes:
	• direct dollar benefit/cost
	• customer benefit
	• stakeholder perception:
	  • shareholders
	  • employees
	  • community
	  • financial community
	  • other
	• life cycle improvements
	• compliance with regulations
	• company sustainability strategy and strategic plans
	• company commitment to covenants and initiatives
	• availability of incentives

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS014003A Optimise sustainability of a process or plant area

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers optimising the sustainability performance of a complete work area in a plant or part of the manufacturing value chain. It includes ensuring that production systems comply with sustainability and other environmental requirements and that optimal process, plant and equipment utilisation is planned and carried out. It also covers problem solving to fully meet sustainability needs and to ensure that production of finished goods meets customer requirements.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus especially work areas that process materials or components to manufacture products. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit scope includes products made, services offered, and use of sites by an organisation or manufacturing value chain member (e.g. supplier of goods or services or a customer).

This unit describes the work conducted by senior operators, technicians, team leaders or frontline managers and other support staff who optimise process systems as part of their work function. The unit includes all items of equipment and unit operations which form part of the process of a complete area and assumes that the required production, technical, science or other operational skills and knowledge necessary to work in the process or work area have already been gained.

All operations are performed in accordance with organisational procedures, licensing requirements, legislative requirements and industrial awards and agreements.

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Analyse and evaluate current sustainability performance of process or work area	1.1 Identify sustainability goals of the enterprise as they relate to work area
	1.2 Compare actual with possible performance
	1.3 Identify abnormal or sub-optimal sustainability performance
	1.4 Identify hazards associated with process, plant and equipment relevant to work area
	1.5 Collect and evaluate relevant records to determine possible causes for sub-optimal sustainability performance
	1.6 Use appropriate techniques to rank possible causes from most to least probable cause
2 Develop plan to optimise sustainable performance of process or work area	2.1 Analyse causes to determine appropriate action
	2.2 Predict the impact of a change in one unit or area on other value chain components
	2.3 Predict the impact of a change on sustainability performance
	2.4 Develop measurable objectives and evaluate alternatives
	2.5 Identify requirements to implement change
	2.6 Consult with stakeholders regarding planned changes and impacts
	2.7 Develop optimisation plan taking account of hazards identified and sustainability implications and communicate to appropriate personnel

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	2.8 Evaluate optimisation action to determine measures of effectiveness
3 Coordinate sustainability optimisation action plan	3.1 Coordinate all appropriate process steps and operations in order to rectify causes in process, plant and equipment performance
	3.2 Initiate and/or implement all required optimisation actions
	3.3 Communicate optimisation outcomes to all relevant personnel
	3.4 Implement procedures and systems to eliminate possible future causes
	3.5 Record all relevant information
4 Develop continuous improvement strategies	4.1 Review sources of information to identify possible factors causing sub-optimal performance
	4.2 Identify options for removing or controlling the risk of sub-optimal performance
	4.3 Assess the adequacy of existing control and quality methods and systems
	4.4 Identify opportunities to continuously improve performance
	4.5 Develop recommendations for continual improvement of process, plant and equipment effectiveness
	4.6 Consult with appropriate personnel and implement continuous improvement strategies Document implementation of continuous improvement strategies

Required Skills and Knowledge

Required knowledge includes:

- principles and theory of the process, equipment and systems used in the work area sufficient to:
  - identify sustainability issues and impacts

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  - identify other hazards associated with the process
  - recognise opportunities to improve and/or enhance the sustainability performance of the plant
  - understand changes or transformations to materials or components occurring during processing
- support functions needed for effective functioning of the process or work area, such as logistics, order processing, warehousing and storage, maintenance and administration
- organisational standard procedures and work instructions
- relevant regulatory requirements, including those related to sustainability and occupational health and safety (OHS) risk control, as appropriate to process/plant area optimisation
- starting quantity and quality of materials
- efficiency maximisation processes relevant to work area
- throughput maximisation processes relevant to work area
- energy efficiency concepts relevant to work area
- potential ecological impacts of work area processes or products
- use of utilities
- labour utilisation concepts relevant to work area, including:
  - overall cost
  - efficient use of equipment
  - reducing downtime
- minimisation of waste and rework
- potential of improved workplace layout and workflow

Required skills include:

- identifying sustainability goals of the enterprise and identifying implications for work area
- analysing process or work area plant and equipment to determine optimal related conditions or performance against enterprise sustainability goals
- interpreting information and making appropriate process control decisions
- distinguishing optimum and marginal performance of the work area process, plant or equipment
- distinguishing effective and marginal sustainability related performance corrections and actions
- identifying and controlling hazards by applying the hierarchy of control as part of the optimisation process
- communicating with team members and specialists on process and sustainability issues
- finding, analysing and using information
- reading and interpreting technical information
- analysing product/process performance data

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse current sustainability performance of a process or plant area and prepare proposals for measurable improvement in sustainability.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • analysing and evaluating current production performance, and developing and implementing plans to optimise process systems • determining sustainability impacts of current processes and products in work area • developing proposals for improvement to processes that are measurable and positively impact on sustainability.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sustainability	Sustainability is used to mean the entire sustainable performance of either the organisation/plant or the process or work area depending on the context of the relevant sentence. It includes: • meeting all regulatory requirements • conforming to all relevant industry covenants, protocols and best practice guides • minimising ecological footprint of process, plant, product or work area • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative OHS impact on employees, community and customer (e.g. OHS impacts of process, product and wastes)
Value chain components	Value chain components include: • all components from source through use to reuse and disposal if necessary
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Procedures	Procedures include: • all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other form
Typical problems	Typical problems will require the application of detailed operational and process knowledge over the entire production/manufacturing area, including the principles of operation of the equipment. For manufacturing areas it may include the science of the changes to materials occurring within that area and the sustainability impacts of those changes

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Environmental sensitivities	Environmental sensitivities may include: • fragile areas, and rare or threatened species • heritage or cultural sensitivity issues • hazardous emissions • real or perceived overuse of scarce resources • noise • regulated emissions or other regulatory issues • community perceptions or other issues
Performance	Performance covers the process, plant and equipment performance. Possible performance includes that performance indicated by: • historical data and records • design performance It may also include process/takt time requirements

Sustainability issues	Sustainability issues (as relevant to the work/process area) may include:
	• need to reduce the carbon footprint of product and process through reduction in use of:
	  • energy
	  • water
	  • raw materials
	  • emissions
	  • embedded carbon in transport, storage, rework and errors, inefficient processes and design
	Sustainability related issues may also exist irrespective of the carbon equivalence aspects of the issue. This may include:
	• current and future availability of raw materials
	• current and future availability of energy
	• extent and type of waste generation and disposal
	• efficiency of process in terms of consumption of materials and energy regarded as in short supply or which are regarded as environmentally sensitive
	• the extent to which the production process, product and waste affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community,

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	(e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities) • extent of regulatory oversight and extent and cost of compliance
Hazards	Hazards is used to include: • sustainability hazards • environmental hazards • health hazards • safety hazards
Data and records	Historical data and records may include: • orders, project briefs or customer specifications • hazard logs • incident reports • maintenance records • errors and non-conformance reports • production records

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS014004A Develop team strategies for more sustainable use of resources

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers leading teams and developing strategies for more sustainable use of resources. The team may be in operations, an operational support function (e.g. maintenance, office or warehouse) or along the value chain (e.g. supplier of goods or services or a customer).

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

This unit applies where a team leader needs to integrate a range of skills and knowledge covering process skills and knowledge and sustainability. The team leader must lead and assist team members to understand and apply a holistic view of their job and the team's role within the organisation and the objectives that the team must meet as part of the sustainability impacts made by the enterprise.

The unit scope includes products made or services offered, and use of sites by an organisation or manufacturing value chain member (e.g. supplier of goods or services or a customer).

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Facilitate the development of process and sustainability knowledge	1.1 Identify sustainability goals of enterprise as they relate to work area
	1.2 Ensure capability of the team
	1.3 Develop mentoring processes for team members in process and sustainability related skills
	1.4 Structure team activities to facilitate the ongoing development of team members
	1.5 Arrange for the development of competency by team members as required
	1.6 Encourage team members to apply technical knowledge to the process
2 Facilitate team improvements to sustainability	2.1 Ensure sustainability requirements, operating procedures and other relevant documents are available to the team
	2.2 Assist team members apply relevant information to the sustainability requirements of the team
	2.3 Encourage team members to identify sub-optimal sustainability performance and make improvement suggestions
3 Resource a proactive approach to sustainability	3.1 Develop communications between specialists outside the team and team members
	3.2 Develop strategies to monitor and deal with key sustainability issues in work area
	3.3 Arrange for resources for team members to identify and take appropriate action on sustainability issues
	3.4 Arrange workforce development for team members, as required, in proactive sustainability techniques
4 Implement sustainability improvements for work area	4.1 Plan the implementation of team suggested and externally directed sustainability improvements

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4.2 Facilitate team member commitment to and involvement in the implementation and monitoring of improvements

4.3 Encourage the application of the Plan, Do, Check, Act (PDCA) approach to the job

4.4 Arrange for workforce development as required to facilitate continued team involvement in sustainability improvement

Required Skills and Knowledge

Required knowledge includes:

- principles behind processes
- process skills and knowledge of team members
- procedures relevant to jobs and processes in work area
- methods of making/recommending improvements
- environmental impacts of materials and energy used/emitted
- environmental sensitivities of all areas impacted by the work/process area (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- mitigation strategies as relevant to work/process area
- sustainability issues relevant to the work/process area
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- identifying sustainability goals of the enterprise and analysing implications for work area and team
- communicating with team members and specialists on process and sustainability issues
- identifying and negotiating changes to teamwork organisation and responsibilities as a result of sustainability issues and associated mentoring and skill development
- representing needs of team in resource allocation processes
- finding information
- analysing and using information
- establishing a proactive teamwork culture

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to integrate process and sustainability skills and knowledge to develop strategies for a team to implement more sustainable use of resources in a process or work area.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • effective team leadership • identifying key features of current processes in work area • analysing current team structure and practices for sustainability related implications • planning, implementing and monitoring change at the team level.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any operational, logistics, administrative, information technology or business process relevant to the work of the team
Capability of the team	Capability of the team includes: • necessary technical knowledge and information about relevant processes and support functions • sustainability related goals • sustainability knowledge and skills
Mentoring processes	Mentoring processes covers formal and informal one-on-one support to team members and may include: • mentoring applied by the team leader directly to team members • mentoring arranged by the team leader to occur through other internal specialist employees • buddy systems within the team where more experienced team members mentor newer team members • external mentors and coaches
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Environmental sensitivities	Environmental sensitivities may include: • fragile areas and rare or threatened species • heritage or cultural sensitivity issues • hazardous emissions • real or perceived over use of scarce resources • noise • regulated emissions or other regulatory issues • community perceptions or other issues

Sustainability issues	Sustainability issues (as relevant to the work/process area) may include:
	• need to reduce the carbon footprint of product and process through reduction in use of:
	  • energy
	  • water
	  • raw materials

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	• emissions
	• embedded carbon in transport, storage, rework and errors, inefficient processes and design
	Sustainability related issues may also exist irrespective of the carbon equivalence aspects of the issue. This may include:
	• current and future availability of raw materials
	• current and future availability of energy
	• extent and type of waste generation and disposal
	• efficiency of process in terms of consumption of materials and energy regarded as in short supply or which are regarded as environmentally sensitive
	• the extent to which the production process, product and waste affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and extent and cost of compliance
	• AS/NZS ISO 14000 Environmental Management Standards

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Procedures	Procedures include: • all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other form
Team	Team may include: • formally designated work teams from all sections of the organisation, including production, maintenance, technical, administration/finance, sales and marketing • ad hoc, temporary or permanent teams/groups who are or should be working as a team
PDCA	PDCA is: • Plan • Do • Check • Act An appropriate alternative is PDMIC: • Plan • Do • Measure • Improve • Control Either approach (or a similar one) is appropriate

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS014005A Apply proactive maintenance strategies to sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers using a proactive maintenance strategy to improve the sustainability outcomes of equipment, plant or process. This unit includes the interaction between maintenance worker and operator as appropriate.

Application of the Unit

This unit applies where an organisation has decided to adopt or is implementing total preventative maintenance/total productive maintenance (TPM), reliability centred maintenance (RCM) or similar strategies (jointly referred to as ‘proactive maintenance’ in this unit) to improve their sustainability outcomes as well as their maintenance outcomes.

The unit applies to employees who have maintenance related responsibilities, including but not limited to, mechanical, electrical, fabrication and other tradespersons, technicians and operators with maintenance related responsibilities.

The unit scope includes processes and operations, products made, internal and external support services and the services offered, and use of sites by another organisation, such as a contractor or value chain member organisation.

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Define sustainability issues for work area	1.1 Identify sustainability goals of enterprise as they relate to work area
	1.2 Identify actual or possible sustainability issues in work area
	1.3 Determine current maintenance strategy for work area
	1.4 Identify changes to maintenance strategy which may improve sustainability outcomes
	1.5 Consult with stakeholders with regard to sustainability issues and possible maintenance changes
2 Assess current maintenance practice for sustainability implications	2.1 Evaluate current maintenance procedures for plant/equipment sustainability implications
	2.2 Discuss current maintenance practices with relevant stakeholders to determine any plant/equipment sustainability issues
	2.3 Recommend changes to improve plant/equipment sustainability impact in accordance with procedures
3 Implement the sustainable maintenance strategy and practices for the work area	3.1 Arrange for changes to be incorporated into procedures and work plans
	3.2 Identify training needs in liaison with relevant personnel
	3.3 Assist personnel to develop required competencies within scope of authority
	3.4 Collect data as required by own work plan
	3.5 Develop required information and compare with performance indicators
	3.6 Recommend sustainability improvements in accordance with procedures

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3.7 Monitor implementation of improvements and recommend any further required changes

Required Skills and Knowledge

Required knowledge includes:

- requirements of the proactive maintenance strategy being implemented
- principles of operation of the equipment/plant
- likely abilities of operations personnel with regard to inspections and servicing
- maintenance procedures relevant to jobs, equipment and processes
- methods of making/recommending improvements
- environmental impacts of materials and energy used/emitted
- environmental sensitivities of all areas impacted by the work/process area (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- mitigation strategies as relevant to work/process area
- sustainability issues relevant to the work/process area

Required skills include:

- communicating with relevant personnel
- planning, organising and prioritising tasks
- reading and interpreting technical information and procedures
- recording data and converting to maintenance and sustainability relevant information
- solving problems to root causes
- identifying maintenance strategies and practices and their impact on sustainability as they apply to equipment and processes in a work area
-

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to assess current proactive maintenance practices for plant and equipment and adapt and implement these practices to achieve improvements in sustainability.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying key features of maintenanace strategies, including breakdown maintenance, TPM, RCM and OEE • identifying current maintenance strategies and practices in a work area • analysisng work area maintenance strategies and practices for sustainability related implications • developing and implementing sustainability improvements.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any manufacturing, logistics, administrative, information technology or other business process which uses equipment or plant that requires maintenance
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Environmental sensitivities	Environmental sensitivities may include: • fragile areas and rare or threatened species • heritage or culturally sensitive issues • hazardous emissions • real or perceived overuse of scarce resources • regulated emissions or other regulatory issues • noise • community perceptions or other issues

Sustainability issues	Sustainability issues (as relevant to the work/process area) may include:
	• need to reduce the carbon footprint of product and process through reduction in use of:
	  • energy
	  • water
	  • raw materials
	  • emissions
	  • embedded carbon in transport, storage, rework and errors, and inefficient processes and design
	Sustainability related issues may also exist irrespective of the carbon equivalence aspects of the issue. This may include:
	• current and future availability of raw materials
	• current and future availability of energy
	• extent and type of waste generation and disposal
	• efficiency of process in terms of consumption of materials and energy regarded as in short supply or which are regarded as environmentally sensitive
	• the extent to which the production process, product and waste affects the environment, including effects on:

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	• climate • quality of local air and water • ecology • noise • relationship with the local and broader community, (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities) • extent of regulatory oversight and extent and cost of compliance

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Procedures	Procedures include: • all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other form
TPM	TPM refers to: • the strategic application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing overall equipment efficiency (OEE)
RCM	RCM refers to: • a strategy which moves maintenance from reactive, or even planned/programmed, towards a focus on uptime and OEE
Similar strategies	Mean time between failure (MTBF): • is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing Failure mode and effects analysis (FMEA): • is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in their routine maintenance while using another technique, such as hazard and operability studies (HAZOP), for design and modification HAZOP is: • a form of FMEA which has been practiced by the process industries for over 30 years and examines the

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	implications of changes in process conditions to process stability
	Condition monitoring:
	• involves monitoring of equipment usually through technical analysis or visual inspection of:
	  • performance in use, including vibration monitoring, noise and extent of exhausts
	  • instrumental analysis of lubricating oil and exhausts
	  • components, such as bearings, seals and hoses
	to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability and performance against sustainability related criteria (e.g. emissions)

OEE	OEE is:
	• the combination of the main factors causing loss of productive capacity from equipment/plant and is where:
	  • availability takes into account losses due to breakdown, set-up and adjustments
	  • performance takes into account losses due to minor stoppages, reduced speed and idling
	  • quality rate takes into account the losses due to rejects, reworks and start-up waste

Maintenance practices	Maintenance practices are the detailed application of the maintenance strategy to individual items of equipment and the maintenance responsibilities and tasks to employees and contractors. Examples that may impact on sustainability include: • increased inspection frequency of equipment above minimum requirements • lubrication and filter changeovers above minimum requirements in order to achieve higher environmental performance • replacement at set intervals to eliminate/reduce breakdowns • duplicate circuits • remote monitoring • increased training of operators in equipment monitoring and minor maintenance

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS014006A Contribute to sustainability related audits

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers contributing to sustainability related audits either as an audit team member or through specifically nominated research and investigations for the audit team. The unit includes understanding the context of the sustainability audit; concepts of usage of resources and wastes; and how they can be expressed as carbon and carbon equivalents; as it applies to sustainability and the type of decisions that information from a sustainability related audit will help to inform.

Application of the Unit

This unit applies to sustainability related audits of a part or whole organisation or its value chain. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The audits may be conducted to assist in regulatory compliance or as part of a strategy to improve the sustainability of an organisation’s operations.

This unit applies to team leaders, technicians or others who may be required to assist in such an audit as part of their work role.

The unit does not cover the skills needed to lead sustainability related audits.

Where detailed operational and process knowledge is required to understand the processes being audited or measure specified inputs, outputs or waste, the relevant skills should be gained through selection of appropriate technical units or alternatively technical assistance obtained.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Identify scope of audit	1.1 Identify target area of audit within the organisation or value chain
	1.2 Identify sustainability related activities to be audited
	1.3 Identify and confirm own role in audit
	1.4 Identify and confirm own timelines and reporting processes
2 Identify work areas, processes and equipment covered by own audit responsibility	2.1 Identify inputs to processes or area being audited
	2.2 Identify material changes or other relevant changes that occur in the work area
	2.3 Identify key items of equipment and their purpose and relevance to the audit
	2.4 Identify measurable outputs of work area and the extent that they are relevant to the audit
3 Undertake measurement tasks	3.1 Identify need, if any, for technical assistance from employees in work area or support sections
	3.2 Measure specified inputs to process or work area
	3.3 Measure specified outputs for process or work area
	3.4 Calculate difference between input and output
	3.5 Calculate measurable sources of waste for process or work area
	3.6 Determine difference between measurable and theoretical waste for process or work area

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	3.7 Compare results to external targets where appropriate
	3.8 Communicate results to audit team
4 Assist in developing strategies for reducing the use of specified input	4.1 Rank equipment or processes by use of specified input and waste generation
	4.2 Calculate current minimum input use by unit of product
	4.3 Develop strategies individually or with others to reduce input use for process or work area
	4.4 Develop strategies individually or with others to minimise waste for process or work area
	4.5 Identify strategies that may have regulatory implications
5 Prepare recommendations for consideration by audit team and stakeholders	5.1 Consult with key stakeholders in area or processes subject to audit
	5.2 Rank strategies by benefit/cost ratio
	5.3 Short-list strategies
	5.4 Prepare recommendations for consideration by audit team and stakeholders

Required Skills and Knowledge

Required knowledge includes:

- typical sources of material and energy wastage, including:
  - inefficiency
  - poor maintenance
  - poor design
  - poor layout
  - lack of sufficient training or skill
- balancing techniques for process and process steps
- methods of measuring actual process amount/flows
- concepts of carbon and carbon equivalence as it applies to sustainability

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- waste reduction strategies and methods along with costs, effectiveness and alternative strategies
- cost-benefit analysis
- relevant legislation, regulation and protocols
- process mapping with regard to sustainability
- process and changes which occur within the process
- environmental impacts of materials and energy used/emitted in both actual and carbon equivalents
- environmental sensitivities of all areas impacted by the work/process area (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- sustainability issues relevant to the work/process area
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- communicating with operational and support employees
- mapping processes and flows of material and energy within a work area or part of a value chain
- interpreting operating procedures, schematics, drawings and other sources of technical information
- calculating, manipulating and interpreting numerical data including totals and proportions, averages and series data
- ranking consumption and waste based on materials or energy balancing within a work area or process
- consulting with technical and operative staff on possible non-obvious energy wastes
- consulting and negotiating with stakeholders on strategies for sustainability improvement
- preparing recommendations

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to identify the scope of a sustainability audit, measure inputs and outputs as directed and recommend sustainability improvements for a process or work area.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying appropriate boundaries for the sustainability related audit • identifying own role and reporting arrangements in audit • accurately measuring inputs and outputs of a process or work area • undertaking benefit/cost ratio analyses.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any manufacturing, logistics, administrative, information technology or business process which could be in a manufacturing value chain
Audit process	Audit processes covered by this unit may include: • audits for regulatory, Global Reporting Initiative (GRI) or other compliance • audits related to responding to a government initiative, incentive • audits against externally set targets (e.g. set by governments, industry codes and clients/customers) • audits of carbon and carbon equivalence usage • energy audits • water audits • emission audits • sustainability related transport audits • efficiency audits, including audits of rejects and reworks

Sustainability related activities	Sustainability related activities may include:
	• carbon emissions
	• specific consumption or emission:
	  • energy
	  • water
	  • raw materials
	  • specific wastes
	• life cycle analyses

Environmental sensitivities	Environmental sensitivities may include: • fragile areas and rare or threatened species • heritage or culturally sensitive issues • hazardous emissions • regulated emissions or other regulatory issues • community perceptions or other issues

Sustainability issues	Sustainability issues (as relevant to the work/process area) may include:
	• need to reduce the carbon footprint of product and process through reduction in use of:
	  • energy
	  • water
	  • raw materials
	  • emissions

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	• embedded carbon in transport, storage, rework and errors, and inefficient processes and design
	Sustainability related issues may also exist irrespective of the carbon equivalence aspects of the issue. This may include:
	• current and future availability of raw materials
	• current and future availability of energy
	• extent and type of waste generation and disposal
	• efficiency of process in terms of consumption of materials and energy regarded as in short supply or which are regarded as environmentally sensitive
	• the extent to which the production process, product and waste affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and extent and cost of compliance
	• AS/NZS ISO 14000 Environmental Management Standards

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Data and records	Historical data and records may include: • orders, project briefs or customer specifications • hazard logs • incident reports • maintenance records • errors and non-conformance reports • production records
Inputs to process	Inputs to process include: • water • energy • materials • carbon equivalence of inputs, where appropriate
Procedures	Procedures include: • all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. good manufacturing practice (GMP) and responsible care) and government regulations Procedures may be: • written, verbal, computer-based or in some other form

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015001A Measure and report carbon footprint

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers determining the carbon footprint of a product or product class across the value chain. It includes determining the carbon dioxide (CO2) equivalent tonnes and the point of obligation for reporting purposes.

It also includes calculating the embodied carbon of a product.

Application of the Unit

This unit applies to the measuring of the carbon footprint along a value chain or portion of a value chain which may be internal or external to the enterprise.

The requirement to measure the carbon footprint could occur as part of an enterprise's regulatory obligation, market or social response or for other purposes.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1 Map carbon sources and sinks along the value chain	1.1 Select portion of the value chain for analysis
	1.2 Identify process steps along the chain
	1.3 Identify the carbon-related change which occurs at each step
2 Determine nature and source for carbon emissions	2.1 Determine carbon emissions from each step
	2.2 Determine source of each emission
	2.3 Identify measurements available for each emission and each source
3 Quantify carbon	3.1 Quantify each emission
	3.2 Determine CO2 equivalent tonnes for each emission
	3.3 Determine point of obligation and total obligation, as required
	3.4 Determine total carbon embodied in product
4 Recommend strategies for reducing carbon footprint	4.1 Short-list high carbon sources
	4.2 Determine root cause of emissions
	4.3 Identify relevant carbon sinks
	4.4 Investigate methods for reducing emissions
	4.5 Prepare recommendation for improvement
5 Report carbon footprint	5.1 Identify purpose of report and key stakeholders
	5.2 Compile data, implications and recommendations
	5.3 Consult with stakeholders, as appropriate

Required Skills and Knowledge

Required knowledge includes:

- process and changes which occur at each step in selected value chain

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- carbon emission sources
- root cause analysis
- methods of reducing carbon emissions and embodied carbon
- carbon equivalence of different emissions
- relevant legislation, regulation and protocols, including greenhouse gas protocols and associated ISO standards

Required skills include:

- calculating, manipulating and interpreting numeric data, including establishing series, means and averages, correlations and rates of change
- calculation of carbon emissions, carbon footprint and embodied carbon
- interpreting specifications, operating procedures, manuals, regulations and other complex documents
- consulting with internal and external stakeholders
- analysing and problem solving
- drafting reports

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to measure carbon or carbon equivalent usage along all or part of a value chain and recommend strategies to reduce emissions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying and mapping portion of value chain for carbon footprint analysis • quantifying carbon footprint, including embodied carbon into each process step • identifying strategies for minimising carbon footprint as part of measure and report process.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Carbon emissions	Carbon emissions means all materials which enter the process or site but which do not leave as part of the product and so includes:
	• known or able to be physically measured emissions of:
	  • gases, vapours and fumes
	  • liquids
	  • solids
	• assumed emissions through material balancing
	• assumed emissions through energy loss, including heat, friction and other energy conversion yield losses
	• relevant greenhouse gases, including those defined under the Kyoto protocol

Embodied carbon	Embodied carbon is the total of carbon consumed in the manufacture, use and disposal of the product expressed as CO2 equivalent tonnes
Portion of the value chain	Portion of the value chain includes: • internal and external value chain sections

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015002A Develop strategies for more sustainable use of resources

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers identifying strategies for more sustainable uses of resources. The unit includes the identification of waste as defined in lean manufacturing (muda) as part of a strategy for achieving better sustainability outcomes in a process as well as quantifying theoretical and actual resource (including energy) consumption.

Application of the Unit

This unit applies inside organisations and their value chains and specifically applies to the use of resources as part of an overall response to improving sustainability. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit assumes that a decision to attempt to achieve more sustainable use of resources has already been made. The unit covers the skills needed for developing a strategic approach to resource use at the organisation or value chain level.

The unit does not cover the technical skills required to implement specific initiatives that may be identified as part of the strategic plan. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Where the carbon footprint (or water footprint or similar) of an enterprise or value chain is known, the unit can be applied to developing strategies for the reduction of that footprint.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility.

For specific techniques covering the auditing of water, energy, emissions and transport, refer to relevant sustainability audit units.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Quantify resource consumption	1.1 Identify all significant resources used by process
	1.2 Identify consumption measurements available for each resource
	1.3 Determine consumption for each resource
2 Quantify resource loss	2.1 Determine theoretical consumption of each resource
	2.2 Compare theoretical consumption with actual consumption
	2.3 Determine loss (emission) for each resource
3 Recommend strategies for reducing waste	3.1 Short-list high emission process steps
	3.2 Analyse process to identify emission steps or locations
	3.3 Determine root cause of emission
	3.4 Investigate methods for reducing emission
	3.5 Develop strategies and recommendations for improvement
4 Prepare resources use audit report	4.1 Identify purpose of report and key stakeholders
	4.2 Compile data, implications and recommendations
	4.3 Consult with stakeholders as appropriate
	4.4 Draft and present report

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Required Skills and Knowledge

Required knowledge includes:

- the concept of muda. Muda is usually summarised under the headings of the 'seven wastes' which include:
  - overproduction
  - delay/waiting
  - transportation
  - over processing
  - excess inventory
  - unnecessary motion
  - defects and rework
- methods of material balancing
- methods of energy balancing
- methods of comparing theoretical with actual resource consumption
- methods for mapping manufacturing processes and resources consumed
- methods of measuring actual resource usage
- concept of muda and muda categories
- muda reduction methods and strategies
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- calculating, manipulating and interpreting numerical data, including establishing series, means and averages, absolute and proportional material and energy usage per product or process, correlations and rates of change
- analysing and conducting root cause analysis
- calculating theoretical consumption of resources as the minimum amount of resources per product or process step as defined by the customer multiplied by the rate of production or process
- calculating actual consumption of resources per unit (e.g. per product, operation, site or value chain)
- writing technical reports
- consulting with technical experts and internal and external stakeholders

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to identify and quantify resources and waste in a process, recommend strategies to reduce waste and prepare a report with recommendations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • quantifying significant resource consumption and emission using materials balancing • identifying and consulting with stakeholders • developing strategies for reducing emissions • preparing and presenting a resources use report.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Waste	Waste in this unit is used in the broader sense of 'muda' as used in lean manufacturing and the competitive manufacturing units of competency developed by Manufacturing Skills Australia (MSA)

Emissions	Emissions means all materials which enter the process/site but which do not leave as part of the product and so includes:
	• known or able to be physically measured emissions of:
	  • gases, vapours and fumes
	  • liquids
	  • solids
	• assumed emissions through material balancing
	• assumed emissions through energy loss, including heat, friction and other energy conversion yield losses

Theoretical consumption	Theoretical consumption of resources is the minimum amount of resources per product as defined by the customer multiplied by the rate of production
Actual consumption	Actual consumption is the amount of a resource entering the value chain
Significant resources	Significant resources includes resources which are deemed to be significant because they are: • high volume • high value • high environmental significance • important to the product or process • covered by legislation or regulation • important to the enterprise It need not include resources which are incidental to the activity and which are not otherwise significant

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015003A Analyse product life cycle for sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers analysing the life cycle of an existing or a proposed product to inform sustainability related decision making.

This unit does not specifically cover design for sustainability which is covered by MSS015004A Design sustainable product or process.

Application of the Unit

This unit applies to analysing all aspects of a product, including its design, production, storage and distribution, use, and end of life reuse, recycling or disposal. This analysis may be undertaken to assist in improving the sustainability of a product or process.

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The technologist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1 Assess raw sources of material and resources	1.1 Identify current or planned materials back to their source in the value chain
	1.2 Identify possible alternative materials/sources
	1.3 Assess the sustainability impacts of each material
2 Assess the production process	2.1 Identify design brief for product
	2.2 Map out the current or planned process
	2.3 Assess the sustainability impacts of each process
	2.4 Assess the sustainability impact of each material on the process sustainability
	2.5 Identify possible alternative steps or processes
	2.6 Determine if alternative steps or processes maintain design brief while improving sustainability
3 Assess the product life and end of life disposal	3.1 Determine sustainability impacts from steps to final consumer
	3.2 Determine sustainability impacts from likely uses and applications
	3.3 Determine sustainability impacts from final use or disposal at end of life
	3.4 Identify possible alternative steps to customer, use and disposal
	3.5 Determine sustainability impacts from these alternatives
4 Develop strategies to improve life cycle	4.1 Identify alternative processes, logistics, usage and disposal with better sustainability impacts
	4.2 Determine requirements to implement these alternatives
	4.3 Determine benefit/cost for each alternative
	4.4 Select preferred alternatives
5 Prepare a recommendation for	5.1 Consult with key stakeholders

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life cycle improvement

5.2 Prepare a recommendation for improving product life cycle

Required Skills and Knowledge

Required knowledge includes:

- value chain for analysed products
- sources and uses of materials
- alternative sources of materials
- production process and sustainability impacts of process
- sustainability impacts of supply chain and delivery chain
- alternative ways of delivering value to customer
- cost-benefit calculation

Required skills include:

- communicating with stakeholders
- analysing processes, logistics, material usages, costs and benefits
- consulting on existing and alternative processes and materials
- preparing recommendations

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to identify determine the life cycle of a product, including resources and materials used in production, and be able to recommend improvements in product life cycle.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying materials and their source in the value chain • identifying current and alternative steps in the production process and their sustainability impact • assessing sustainability impact to end of life • suggesting sustainability improvements at each stage of life cycle • analysing re-use and recycling options.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Materials	Materials include: • both materials directly used and also materials which comprise components which are used • materials/resources which may be consumed to make a physical product • materials which may be consumed in delivering a service (e.g. fuel, energy and other consumables)
Design brief	Design brief includes the aims and objectives of the original product design, including: • regulatory environment • material specifications • production process • estimated and actual material and energy consumption • budget • timelines • product use and disposal assumptions • market assumptions, including target groups, product image and cost

Sustainability impact	The sustainability impact of a product and process may include:
	• carbon footprint of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community, (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance

Product life cycle	Product life cycle includes: • the entire life cycle of a product through design, manufacture, service and disposal

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Final use or disposal at end of life	Final use or disposal at end of life covers decisions and actions on: • reuse for modified or different purpose • recycling of components • disposal

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015004A Design sustainable product or process

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to redesign an existing, or design a new, product or process to achieve optimal sustainability outcomes

This unit does not cover analysing product life cycle which is covered by MSS015003A Analyse product life cycle for sustainability.

Application of the Unit

This unit applies to the design/redesign of processes and their associated products as appropriate to achieve optimal sustainability outcomes. The unit does not supply the technical competence for design of a particular product or process. It is anticipated that this unit would be undertaken in conjunction with appropriate technical design and technical supporting units which because of the variety of manufactured products and the varying technical skill required for their design are unable to be specified.

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

This unit would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. Specific units covering these and similar aspects are contained within the MSS40211 Certificate IV in Environmental Monitoring and Technology.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Define parameters of new/improved product	1.1 Consult with relevant stakeholders to determine required function, performance and aesthetics of new product
	1.2 Identify market, expected time to market and cost constraints of product and production process
	1.3 Identify requirements with possible high sustainability impacts
	1.4 Negotiate requirements to achieve desired sustainability impacts
	1.5 Develop agreed definition of product requirements
2 Develop alternative product and process designs	2.1 Identify alternative resource requirements
	2.2 Identify alternative processes
	2.3 Determine the possible sustainability impacts of different combinations of resources and processes
	2.4 Test alternative product and process designs against original product requirement definitions
	2.5 Identify product requirements which may be causing significant sustainability impacts
	2.6 Renegotiate, where possible, product requirements to lessen sustainability impacts
	2.7 Short-list preferred resources and processes
3 Evaluate life cycle impacts	3.1 Estimate life cycle sustainability impacts for each short-listed alternative
	3.2 Identify process steps with greatest sustainability impact
	3.3 Evaluate process steps for alternatives/modifications with

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	lower impact
	3.4 Select alternative which best meets requirements and has the lowest sustainability impact
4 Confirm design	4.1 Develop selected design as required
	4.2 Confirm life cycle sustainability impacts
	4.3 Review design against product requirements
	4.4 Obtain required authorisations
	4.5 Document design in the required form
5 Prepare for implementation	5.1 Consult with key stakeholders
	5.2 Identify key measures for monitoring implementation of design
	5.3 Identify data sources required by key measures
	5.4 Organise for data to be captured and manipulated, as required

Required Skills and Knowledge

Required knowledge includes:

- sustainability impacts from using different materials and different processes and to produce products of different specifications and life cycle outcomes
- alternative sources of materials and components and the sustainability differences of each
- alternative processes and the sustainability differences of each, including expression in terms of carbon equivalence
- product and process design
- design documentation
- methods of monitoring of product development and manufacture
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- communicating complex concepts and designs to stakeholders
- consulting and negotiating with stakeholders on possible alternatives
- analysing processes, logistics, material usages, costs and benefits, including expressing the results of analyses in carbon equivalence
- life cycle estimation
- determining sustainability impacts from material/components and process interactions

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- designing products and manufacturing processes for optimal sustainability outcome

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to design products and associated processes to achieve optimal sustainability outcomes over the product life cycle. The assessment emphasis is on the ability to design for sustainability not on the engineering or other technical aspects of the design process.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • including sustainability in definition of product requirements • design optimises the sustainability outcomes over product life cycle or process • design includes means of monitoring sustainability outcomes over product life cycle or process.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Parameters of new product	Parameters of new product may include: • function • form • market • desired sustainability performance • cost

Sustainability impact	The sustainability impact of a product and process may include:
	• resource footprint (e.g. carbon and water) of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community, (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance

Resource	Resource includes: • both materials and energy
Review design	Review design includes: • ensuring product and process meets requirements • analysis to identify further improvements

Unit Sector(s)

Sustainability

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Custom Content Section

Not applicable.

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MSS015005A Develop required sustainability reports

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers drafting reports required to meet regulatory or other sustainability reporting requirements. The reports may require the inclusion or interpretation of technical data.

It includes the development of formats or internal reporting templates to meet the public reporting needs of the organisation.

Application of the Unit

This unit applies to the development, production and oversight of sustainability reports for an organisation or part of an organisation. The reports may be required for regulatory, Board, employee, shareholder or community reporting purposes. Reports may be completed by an individual or be prepared by a team. Where team preparation is involved this unit supplies the skills for coordinating the report production.

Reports covered by this unit may relate to all aspects of an organisation's sustainability or may focus on particular aspects, such as carbon footprint, waste generation and control, environmental, ecological and community impacts. Where a specific type or format of report is required for regulatory purposes, MSS015017A Develop regulated sustainability reports, should be selected.

There is a requirement to present and organise data. The complexity of this requirement will vary according to the reports required and type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine requirements of sustainability report	1.1 Establish purpose of report
	1.2 Determine compliance requirements of report
	1.3 Identify any commercial requirements which may be impacted by these requirements
	1.4 Determine benefits which may be obtained from report for the organisation
2 Locate data sources and processes needed to generate required information	2.1 Identify sources of data currently available within the organisation
	2.2 Identify external sources of data required
	2.3 Identify any data gaps and develop strategies for obtaining required data
	2.4 Obtain necessary authority to access external data sources, as required
	2.5 Negotiate with relevant stakeholders to obtain necessary data which is not currently available
3 Develop templates, protocols and procedures needed for report	3.1 Develop data collection and information reporting templates and procedures
	3.2 Implement systems and procedures for obtaining required information from collected data
	3.3 Develop templates and protocols for required report sections and appendices
	3.4 Ensure other report contributors have the required competencies and resources to draft their input

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	3.5 Agree on timelines for preparation of report components
4 Compile required report	4.1 Monitor the development of report components
	4.2 Take appropriate action to ensure timely completion of components to requirements
	4.3 Assemble components into report
	4.4 Complete report
	4.5 Review and adjust completed report, as required

Required Skills and Knowledge

Required knowledge includes:

- sustainability related regulatory and other compliance reporting requirements
- commercial reporting requirements
- possible organisational benefits from sustainability reporting
- internal and external data sources
- organisational protocols and procedures for obtaining and using data
- data manipulation and interpretation
- project planning and control
- editing and reviewing of report inputs by others
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- negotiating data collection procedures and reporting contributions from other contributors
- analysing sustainability related data
- collating, interpreting, and presenting statistical data sets and other numeric information, including data series, means and averages,
- writing reports
- using word processing and other software required for data collection and analysis

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to produce required sustainability reports, including locating data and developing or following templates, and produce report to regulatory or other requirements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • properly identifying compliance and commercial aspects of the report • ensuring information collecting and processing are appropriate for scope of required report • producing report to required format and timeline.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Regulatory report	Regulatory report may be to meet requirements of: • regulatory requirements (e.g. energy efficiency, hazardous waste, National Pollutant Inventory (NPI), emissions and carbon) • state/federal environment departments • local government • energy/water authorities • Therapeutic Goods Administration (TGA) • AS/NZS ISO 14000 Environmental Management Standards • other regulatory bodies
Commercial reporting requirements	Commercial reporting requirements may include reports required by, or for: • Australian Stock Exchange (ASX) • Australian Competition and Consumer Commission (ACCC) • Board of Directors • shareholders • lending and insurance organisations • employees • community groups

Sustainability impact	The sustainability impact of a product and process may include:
	• resource footprint (e.g. water, carbon and carbon equivalent) of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community
	• extent of regulatory oversight and cost of compliance

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015006A Report to Global Reporting Initiative guidelines

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers drafting reports to meet the Global Reporting Initiative (GRI) guidelines and to self declare the application level.

Application of the Unit

This unit applies to individuals who seek to report on an organisation's compliance against the GRI guidelines. The GRI provides an international and widely used sustainability reporting framework that many organisations choose to use

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine GRI report content, quality and boundary	1.1 Identify appropriate report scope
	1.2 Identify appropriate report boundaries
	1.3 Identify appropriate application level
	1.4 Identify any appropriate supplements to the report
	1.5 Determine the implications for scope, boundaries, application level and supplements of the report
	1.6 Confirm the adoption of GRI factors with relevant stakeholders
2 Draft GRI standard disclosures	2.1 Identify data required to complete standard disclosures
	2.2 Negotiate with relevant stakeholders to obtain any required data not currently available
	2.3 Ensure systems are in place to convert data to required information
	2.4 Ensure the timely availability of the required information
	2.5 Draft standard disclosures
3 Draft any GRI supplements	3.1 Identify data required to complete supplements
	3.2 Negotiate with relevant stakeholders to obtain any required data not currently available
	3.3 Ensure systems are in place to convert data to required information
	3.4 Ensure the timely availability of the required information
	3.5 Draft supplements
4 Validate report meets	4.1 Compile GRI report

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application level requirements	4.2 Audit report for compliance with requirements
	4.3 Review and adjust report as required

Required Skills and Knowledge

Required knowledge includes:

- GRI guidelines
- related regulatory and other compliance reporting requirements
- related commercial reporting requirements
- possible organisational benefits from GRI reporting
- internal and external data sources
- organisational protocols and procedures for obtaining and using data
- data manipulation and interpretation
- project planning and control
- editing and reviewing of report inputs by others

Required skills include:

- negotiating data collection procedures and reporting contributions from other contributors
- analysing GRI required data
- collating, interpreting and presenting statistical data sets and other numeric information, including data series, means and averages
- writing reports
- using word processing and other software required for data collection and analysis
- identifying and prioritising stakeholders

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to must prepare reports to GRI guidelines and to self-declare the application level.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating knowledge of GRI sustainability reporting guidelines also known as the G3 guidelines • matching GRI guidelines to an organisation's operations • producing report according to GRI guidelines.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

GRI	The GRI is a network-based organisation that has developed the world's most widely used sustainability reporting framework. For the purpose of this unit, the GRI also refers to the GRI sustainability reporting guidelines also known as the G3 guidelines. GRI terms used in this unit have the meaning given to them by the GRI
GRI sustainability reporting guidelines	A GRI sustainability report must comply with the guidelines in terms of: • content, including materiality, stakeholder inclusiveness, sustainability context and completeness • report quality, including reliability, clarity, balance, comparability, accuracy and timelines • report boundary • profile disclosures on strategy and analysis, organisation profile, report parameters and governance • management approach • performance indicators • sector requirements listed in GRI sector supplements Note: not all GRI guideline categories are listed
Standard disclosures	Standard disclosures means those things included in all GRI reports as defined by the GRI
Supplements	Supplements means those additional things it is agreed to report as defined by the GRI
Application level	Application level is the level C, B or A as defined by the GRI
Data	Data includes: • information on past and current performance • performance indicator trends over time • information from along the value chain, both internal and external to the organisation

Unit Sector(s)

Sustainability

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Custom Content Section

Not applicable.

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MSS015007A Develop a business case for sustainability improvements

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers developing an appropriate business case for proposed changes which will deliver improvements to the sustainability of a process or organisation.

It includes benefit/cost and return on investment (ROI) analyses.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit applies to the development of a business case for sustainability related improvements to an organisation's products or processes. The business case may relate to the whole or part of an organisation, or to the whole or part of the value chain (e.g. suppliers of goods or services or customers). The business case may be required for sustainability related improvements in response to regulatory, Board, employee, shareholder or community requests or pressure. The business case may be completed by an individual or be prepared by a team.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Define the intended sustainability improvement project	1.1 Define the purpose of the project
	1.2 Determine the project goals
	1.3 Determine regulatory requirements
	1.4 Determine stakeholders for project
	1.5 Clarify the critical success factors for the project
	1.6 Quantify the current state
2 Quantify expected benefits from the project	2.1 Determine cost of any capital improvements from the project
	2.2 Determine production improvements
	2.3 Determine maintenance improvements
	2.4 Determine product life cycle improvements
	2.5 Determine regulatory health, safety and environment (HSE) improvements
	2.6 Estimate total benefit of proposed project
3 Determine costs required to implement project	3.1 Estimate fixed capital costs required
	3.2 Estimate personnel costs required
	3.3 Estimate financial costs required
	3.4 Estimate time required for project and time-related costs
	3.5 Estimate total costs of project
4 Prepare a proposal justifying project	4.1 Determine ROI, sustainability and other project benefits

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4.2 Determine costs if any of not proceeding with the project

4.3 Compare benefits to costs using appropriate methods

4.4 Prepare proposal for project

Required Skills and Knowledge

Required knowledge includes:

- characteristics of good project purposes and goals
- regulatory environment and requirements for sustainability related project, including HSE aspects
- concept of capital versus operational improvements
- characteristics of good critical success factors and key performance indicators
- internal and external data sources
- project costing methods for capital, personnel, financial and time related costs
- methods of quantifying project benefits
- ROl calculations
- cost-benefit calculation
- relevant accounting conventions and requirements and the alternative lean view, where appropriate
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- analysing processes, logistics, material usages, costs and benefits
- analysing the regulatory environment as it applies to an organisation and determining implications for products and processes
- collating, interpreting, and presenting statistical data sets and other numeric information, including data series, means and averages

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to prepare a business case, including appropriate analyses, for sustainability related improvements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying sustainability goals and relating these goals to current and future states • determining costs of sustainability related improvements across an organisation's operation or value chain • making RoI calculations • preparing project proposals that clearly define and quantify costs and benefits and presents a cogent and valid argument for proceeding with the project (or otherwise).
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Expected benefit	Expected benefit may be a benefit against: • business • ecological • social • sustainability goals
Capital improvements	Capital improvements covers: • the purchase, installation, construction and commissioning of new equipment • alterations to existing equipment designed to improve the sustainability of the organisation's operations and which will be classed as capital in the organisation's balance sheet
Production improvements	Production improvements are improvements to processes such as: • work re-organisation • eliminating or changing operating steps • use of different materials, components or supplies • changing equipment and process conditions The improvements may or may not: • involve expenditure of a capital or operating nature
Maintenance related improvements	Maintenance related improvements are changes to maintenance procedures, such as increased: • condition monitoring • maintenance frequency designed to improve the efficiency and sustainability of operating equipment Maintenance improvements may require: • capital or non-capital expenditure
Product life cycle improvements	Product life cycle improvements are: • improvements to the entire life cycle of a product through design, manufacture, service and disposal
Regulatory HSE improvements	Regulatory HSE improvements are: • changes designed to improve the organisation's compliance to sustainability related Acts and regulations
Personnel costs	Personnel costs may include: • costs related to recruiting new staff, retrenchments, training and retraining and use of contract labour for sustainability related improvements

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Time-related costs	Time-related costs include: • the time value of money and may also include maintenance of new plant as part of the project
ROI	ROI means return on investment and relates in this unit to assessing the returns (positive and negative) on the investment required to make sustainability improvements. The actual formula used and the definitions of factors and hurdle rates adopted should be consistent with standard practice for the organisation

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015008A Develop strategic sustainability plans

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers developing plans to transition an organisation to sustainability and also to improve the sustainability of an organisation. This would typically be done before the development of a business case. An implementation plan would typically follow sanction of the business case.

Application of the Unit

This unit covers the strategic planning skills needed for sustainability related improvements. The sustainability related improvements often affect all or major parts of an organisation and it's value chain and as a result detailed strategic planning is usually required to ensure the support of all stakeholders to minimise disruption to the organisation's business.

The need for a strategic approach to sustainability may be in response to regulatory, Board, employee, shareholder or community requests or pressure International agreements, reporting requirements, codes of practice, business efficiency, energy cost reduction, waste reduction goals and consumer demand and expectations. The development of the strategic plan may be done individually or as part of a team.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

This unit does not cover the development of a formal business case which is covered by MSS015007A Develop a business case for sustainability improvements.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

THis unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine current sustainability status of the organisation	1.1 Determine main organisational motivations and drivers for improved sustainability
	1.2 Determine current regulatory environment
	1.3 Determine current availability of data required for sustainability indicators
	1.4 Arrange for sustainability related audits if required
2 Identify priority areas for improvement	2.1 Identify strategic goals of the organisation and how these are impacted by sustainability
	2.2 Determine suggestions for major improvement
	2.3 Rank suggestions
	2.4 Short-list improvements to be progressed
3 Establish an appropriate project team	3.1 Arrange for a team leader to be allocated for each short-listed suggestion
	3.2 Ensure an appropriate project team is established for each suggestion
	3.3 Define expected outcomes and performance indicators for each suggestion
	3.4 Ensure appropriate project plans are developed
4 Design potential improvement	4.1 Arrange for project designs to be developed
	4.2 Ensure appropriate evaluation is undertaken of each project
	4.3 Select suggestions to be implemented
5 Develop strategic plan	5.1 Identify implications of strategic sustainability plan for the organisation

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5.2 Estimate implementation timelines

5.3 Identify strategic approvals for implementation

5.4 Identify required documentation

5.5 Draft plan to guide proposal to sanction

Required Skills and Knowledge

Required knowledge includes:

- strategic directions of the organisation
- common strategic planning tools, such as SWOT analysis
- methods of identifying possible sustainability improvements
- cost-benefit determination processes
- project planning and monitoring methods and principles
- project, product and process design principles
- evaluation methods
- planning principles
- AS/NZS ISO 14000 Environmental Management Standards
- relevant codes, schemes and legislation/regulation

Required skills include:

- analysing implications for processes, logistics, material usages, costs and benefits of a strategic approach to sustainability
- analysing the regulatory environment as it applies to an organisation and determining implications for products and processes
- undertaking strategic planning, including SWOT analyses and analysis of the organisation's current and future political, economic, social and technological position, and the impact of each on sustainability options
- communicating and negotiating with stakeholders and regulators to identify key sustainability issues and options
- analysing data from sustainability related audits and operational performance indicators

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to develop formal plans for sustainability strategy, including establishing project teams and designing improvements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining sustainability drivers of an organisation and its value chain • determining sustainability improvement options and rank by benefit/cost • developing sustainability project plans, including key performance indicators and timelines • integrating sustainability improvement plans with other goals and strategic directions of the organisation.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sustainability status	Sustainability status may include:
	• resource footprint (e.g. carbon, water and energy) of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance

Sustainability indicators	Sustainability indicators include: • water usage • energy usage • emissions • indicators for ethical/sustainable supply chain • community relationships/complaints • staff turnover • safety record • compliance with regulations and codes of practice • reduced waste • increased recycling • product improvement • meeting consumer expectations for sustainable use of resources • other indicators appropriate to the organisation, its value chain, processes and operations
Suggestions for major improvement	Suggestions for major improvements might come from: • non-compliances/near misses/incident reports • kaizen and other improvement processes • benchmarking activities • regulatory and non-regulatory related audits • community pressure

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	• Board directions • changes in market • suppliers • customers Suggestions may be improvements to one or more of: • products • processes • employee, health, safety and environment (HSE) or amenity • impact on the community • impact on the environment • efficiency and profit • waste management • emergency/incident response • facility/building design and management
Rank suggestions	Suggestions may be ranked by: • need • benefit/cost • strategic impact
Teams	Teams for strategic plan development may be: • formal or informal teams and may be devoted to the project for its duration or it may be part of other duties

Strategic approvals for implementation	Strategic approvals for implementation might include:
	• regulatory approvals
	• financial approvals
	• internal approval processes including determining:
	  • senior management/shareholder approvals
	  • human resource implications, such as career paths and position descriptions
	  • operational management approvals
	  • supplier/client/contractor approvals

Required documentation	Required documentation might include: • formal report or plan • business case • environmental impact statement
Sanction	Sanction is the process the organisation requires for approval to proceed to be granted

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015009A Implement sustainability plans

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers gaining support for and implementing sustainability plans. It also includes the monitoring/measuring of changes resulting from the implementation, comparing these changes to the intended changes and recommending modifications which will result in further improvement.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The unit assumes that sustainability improvements have gained all required approvals. The improvements may be in response to planned or current regulatory requirements or may be related to organisation generated improvement proposals.

As sustainability related improvements often affect all or major parts of an organisation and will also often include suppliers, distributors and customers, implementation will usually be required to ensure the support of stakeholders across the value chain in order to minimise disruption to the organisation's business and to maximise benefits. Depending on the nature and size of the business appropriate value chain units should also be selected such as MSACMS601A Analyse and map a value chain

(Note: this unit has the prerequisite MSACMT631A Undertake value analysis of product costs in terms of customer requirements).

This unit does not cover the development of a formal business case which is covered by MSS015007A Develop a business case for sustainability improvements.

This unit would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. However, there is a requirement to identify and validate data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Establish required support for proposed sustainability related improvements	1.1 Identify key stakeholders
	1.2 Identify benefits of proposal for each stakeholder
	1.3 Identify causes of resistance to proposal
	1.4 Negotiate with key stakeholders and gain support
2 Establish systems for monitoring implementation	2.1 Agree on implementation timelines
	2.2 Develop agreed indicators of progress
	2.3 Establish data collection systems and responsibilities for each indicator
	2.4 Validate data collection against indicators
3 Implement improvement plan	3.1 Update project implementation plan as required
	3.2 Take required actions to have plan implemented
	3.3 Monitor progress using agreed indicators
	3.4 Analyse progress to plan

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	3.5 Take control actions necessary
	3.6 Modify implementation plan as required
	3.7 Report on progress
4 Recommend further improvements	4.1 Measure improvements actually obtained
	4.2 Identify non-compliances with planned improvements
	4.3 Determine desirable additional improvements
	4.4 Obtain approvals for improvements
	4.5 Implement improvements to sustainability plan

Required Skills and Knowledge

Required knowledge includes:

- methods of determining benefits of sustainability improvement projects, including benefits defined in terms of:
  - improvement in carbon or carbon equivalent of process or operation
  - use of water, where this is part of the process or operation
  - waste generation
  - life cycle of product
  - process efficiency
  - impact on the environment
  - regulatory compliance
- causes of resistance and methods of dealing with resistance
- sources of data
- data validation techniques
- project planning and monitoring
- improvement measures
- techniques to analyse data for trends, aberrations and factors requiring action
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- consulting and negotiating with stakeholders on implementation process for sustainability improvement
- monitoring and controlling projects

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- analysing data against progress indicators
- determining changes to sustainability implementation plan where required
- reporting on progress and obtaining approvals for changes where required

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to gain support for and implement a sustainability plan that has already been developed.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining the organisation and manufacturing value chain key stakeholders • determining systems for monitoring project plan implementation • identifying and analysing non-conformances for improvements to project plan.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sustainability improvement	Sustainability improvements of a product and process may include:
	• resource footprint (e.g. carbon, water and energy) of product and process
	• current and future availability of materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance
	• meeting external sustainability benchmarks

Improvement actions	Improvement actions may include: • the purchase and installation of new equipment or alterations to existing equipment • improvements to manufacturing processes, such as work re-organisation, eliminating or changing manufacturing steps and use of different raw materials • changes to maintenance procedures, such as increased condition monitoring and maintenance frequency designed to improve the efficiency and sustainability of operating equipment • product life cycle improvements • changes designed to improve the organisation's compliance to sustainability related Acts and regulations
Documentation	Documentation includes: • standard operating procedures • drawings and specifications • training and assessment manuals Documentation may be: • in any form; paper or electronic

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015010A Conduct a sustainable water use audit

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers conducting an audit for the specific resource of water in a manufacturing organisation, or part or all of a value chain.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The water use audit may be conducted to assist in regulatory compliance or as part of a strategy to improve the sustainability of operations. The emphasis in the unit is on informing decision making in regards to water use. Where complex field or laboratory analysis skills or analysis of the effect of water use on local ecology are required appropriate units should be selected from the MSL09 Laboratory Operations Training Package.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

THis unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Identify all sources and uses of water in process	1.1 Identify and categorise by quality all sources of water external to the site
	1.2 Identify and categorise by quality all sources of water within the site
	1.3 Identify all uses of water by process and category
	1.4 Identify water quality required by each process unit
2 Calculate theoretical use of water	2.1 Calculate theoretical net use of water for each process unit
	2.2 Calculate overall water balance for process/site
	2.3 Evaluate the need for water consumption and water quality by process and units within the process compared to alternative processes/units
3 Measure actual use of water	3.1 Determine actual net water use for overall process/site
	3.2 Determine actual net water use for each process unit
	3.3 Calculate difference between theoretical and actual water use by unit and overall
	3.4 Identify actual water quality used by each process unit
4 Develop strategies for reducing the use of water	4.1 Rank units by difference between theoretical and actual water use
	4.2 Rank units by actual water use
	4.3 Identify units using higher quality water than required
	4.4 Develop strategies to reduce water consumption and/or use lower quality water
5 Prepare a recommendation for a water use reduction strategy	5.1 Consult with key stakeholders
	5.2 Identify strategies required to meet regulatory or similar requirements

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5.3 Rank strategies by benefit/cost ratio

5.4 Short-list preferred water reduction strategies

5.5 Prepare recommendation for improving water usage

Required Skills and Knowledge

Required knowledge includes:

- characteristics of water of different qualities
- typical water usage on a site:
  - domestic (kitchens and restrooms)
  - aesthetics (gardens and ponds)
  - process (cleaning, diluting and dissolving)
  - energy exchange (heating and cooling)
- specific water usages within production or operational processes undertaken by the organisation
- 'grades' of water and typical applications for water of different qualities
- strategies and methodologies for determining water quality
- strategies and sources of advice for determining impact of changes to water usage or quality with products or processes
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- negotiating with managers, supervisors, technical staff, suppliers and customers over current and future water use
- interpreting technical data related to water use within an organisation or value chain
- preparing reports on current and future water use

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to conduct a sustainability water audit, including calculation of theoretical and actual use of water and preparation of recommendations for water use reduction.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying ranges of water quality as per range statement • calculating theoretical and actual water use by water quality • matching water quality to site or value chain needs • considering benefit/cost arguments for different water strategies.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sources within the site	Sources within the site includes: • water generated by process, rain water and other natural water sources
Net use of water	Net use of water is: • water consumed minus water generated
Water quality	Water is available at a range of qualities which are suitable for various uses. Quality includes: • deionised/highly treated (e.g. high pressure boiler feed) • potable water • groundwater • waterway/reservoir • recycled water • grey water • black water • wastewater

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015011A Conduct a sustainability energy audit

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers conducting an audit for the specific resource of energy in an organisation or part or all of its value chain and to prepare recommendations for a reduction of, and more efficient use of, energy.

Application of the Unit

This unit applies inside organisations and their value chains. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations (e.g. supplier of goods or services or a customer).

The energy audit may be conducted to assist in regulatory compliance or as part of a strategy to improve the sustainability of manufacturing operations. The emphasis in the unit is on informing decision making in regards to energy use in a value chain or site. Where complex electrical and other energy analysis skills are required appropriate units should be selected from the MEM05 Metal and Engineering Training Package.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation’s processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

THis unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Identify all sources and uses of energy in process	1.1 Identify all sources of energy external to the site
	1.2 Identify all sources of energy within the site
	1.3 Identify all uses of energy by process unit
	1.4 Identify energy type and intensity required by each process unit
2 Calculate theoretical use of energy	2.1 Calculate theoretical net use of energy by type and intensity for each process unit
	2.2 Calculate overall energy balance for process/site
	2.3 Evaluate the need for energy consumption by process and units within the process compared to alternative processes/units
3 Measure actual use of energy	3.1 Determine actual net energy use for overall process/site
	3.2 Determine actual net energy use for each process unit
	3.3 Calculate difference between theoretical and actual energy use by unit and overall
	3.4 Identify actual energy type used by each process unit
4 Develop strategies for reducing the use of energy	4.1 Rank units by difference between theoretical and actual energy use
	4.2 Rank units by actual energy use
	4.3 Identify units using higher intensity energy than required
	4.4 Develop strategies to reduce energy consumption

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	and/or use lower intensity energy
5 Prepare a recommendation for an energy use reduction strategy	5.1 Consult with key stakeholders
	5.2 Identify strategies required to meet regulatory or similar requirements
	5.3 Rank strategies by benefit/cost ratio
	5.4 Short-list preferred energy reduction strategies
	5.5 Prepare recommendation for improving energy usage

Required Skills and Knowledge

Required knowledge includes:

- nature of energy wastage:
  - efficiency
  - friction/fouling/scaling
  - temperature/pressure range of operation
- energy balancing techniques for process and process steps (sometimes known as heat balancing)
- methods of measuring actual process amount/flows
- waste reduction/energy efficiency strategies and methods along with costs, effectiveness and alternative strategies (e.g. efficient lighting, efficient window glass and efficient motors)
- cost-benefit analysis
- relevant legislation, regulation and protocols
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- mapping processes and energy flows
- interpreting schematics and drawings
- calculating, manipulating and interpreting numerical data, including establishing series, means, correlations and rates of change
- ranking energy consumption and waste based on energy balancing
- consulting with technical and operative staff on possible non-obvious energy wastes
- consulting and negotiating with stakeholders on implementation process for sustainability improvement
- preparing recommendations

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to conduct an energy audit, including calculation of theoretical and actual use of energy and preparation of recommendations for energy use reduction.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • defining appropriate boundaries for the sustainability energy audit • conducting energy balance analyses for a site or value chain • identifying high energy use/waste units/areas • undertaking benefit/cost ratio analyses • ensuring improvement strategies proposed reflect stakeholder needs and regulatory environment.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Energy/energy type	Energy/energy type includes: • operational heating and cooling • motive energy • lighting • waste energy
Theoretical use of energy	The amount of energy (work) required to move a mass or heat matter is a basic physics calculation. This is the theoretical use of energy. Anything used above this is waste (although in physics it may be referred to as inefficiency)
Energy intensity	Energy intensity includes: • required temperature, power and pressure, as relevant

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015012A Conduct an emissions audit

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers conducting an audit of emissions related to product or process in an organisation, or part or all of the value chain.

Application of the Unit

This unit applies to auditing emissions inside organisations and their value chains (e.g. supplier of goods or services or customer). The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The audit may be conducted to assist in regulatory compliance or as part of a strategy to improve the sustainability of manufacturing operations.

The emphasis in the unit is on informing decision making in regards to emissions using material balancing techniques. While the unit does not preclude actual measurement of emissions it does not cover the measurement/testing or other technical skills to undertake physical measurement of emissions or environmental impact of the emissions. If required, these skills should be selected from the MSL09 Laboratory Operations Training Package or the Environmental Monitoring and Technology suite of qualifications. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Identify all sources and uses of materials in process	1.1 Identify all sources of materials external to the site
	1.2 Identify all sources of materials within the site, where appropriate
	1.3 Identify all uses of materials by the process overall
	1.4 Identify all uses of materials by each process unit
2 Calculate theoretical use of the materials	2.1 Calculate theoretical net consumption of material for each process unit
	2.2 Calculate overall material balance for process/site
	2.3 Evaluate the need for material consumption by process and units within the process compared to alternative processes/units
3 Measure actual use of materials	3.1 Determine actual net material consumption for overall process/site
	3.2 Determine actual net material consumption for each process unit
	3.3 Calculate difference between theoretical and actual material consumption by unit and overall
	3.4 Identify actual emissions by each process unit
4 Develop strategies for reducing emissions	4.1 Rank units by difference between theoretical and actual material consumption
	4.2 Rank units by actual material consumption
	4.3 Develop strategies to reduce material consumption
5 Prepare a recommendation for an emissions reduction strategy	5.1 Consult with key stakeholders
	5.2 Identify strategies required to meet regulatory or

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similar requirements

5.3 Rank strategies by benefit/cost ratio

5.4 Short-list preferred emission reduction strategies

5.5 Prepare recommendation for reducing emissions

Required Skills and Knowledge

Required knowledge includes:

- nature of emissions:
  - point vs. disperse
  - identified source vs. fugitive
  - solid (both particulate and mass), liquid (solutions, emulsions and dispersed matter) and gas (including fumes and vapours)
- material balancing techniques for process and process steps (sometimes known as mass balancing)
- methods of measuring actual process amount/flows
- emission reduction strategies and methods along with costs, effectiveness and alternative disposal strategies caused
- cost-benefit analysis
- relevant legislation, regulations and protocols
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- mapping processes and material flows
- interpreting schematics and drawings
- calculating, manipulating and interpreting numerical data, including establishing series, means, correlations and rates of change
- ranking material consumption and emissions based on material balancing
- consulting with technical and operative staff on possible non-obvious sources of emissions (fugitive emissions)
- consulting and negotiating with stakeholders on implementation process for sustainability improvement
- preparing recommendations
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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to conduct an emissions audit, including use of material balancing techniques and preparation of recommendations for emission reduction.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • defining appropriate boundaries for the sustainability emissions audit • conducting material balance analyses for a site or value chain • identifying high emissions units/areas • undertaking benefit/cost ratio analyses • ensuring improvement strategies proposed reflect stakeholder needs and regulatory environment.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Emissions	Emissions refers to: • the difference between material entering a process and product leaving the process
Materials	Materials include: • materials directly used and also materials which comprise components which are used • materials/resources which may be consumed to make a physical product • materials which may be consumed in delivering a service (e.g. fuel, energy and other consumables)
Theoretical consumption	Theoretical consumptions includes: • consideration of the relevant physics, chemistry and biology of the process to determine theoretical yield as well as assuming zero defective product
Net consumption	Net consumptions refers to: • the difference between materials consumed and produced, where relevant

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015013A Conduct a sustainability related transport audit

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers conducting an audit for the specific resource of transport and to develop recommendations to improve the sustainability of transport operations.

Application of the Unit

This unit applies to organisations and their value chains (e.g. supplier of goods or services or customer) that are seeking to determine their current and desirable future use of transport resources as part of a sustainable strategy. The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

The transport audit may be conducted individually or as part of a team. The need for a transport audit may be the result of an organisation's own decisions to increase the sustainability of its operations or be required for regulatory or other purposes.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

THis unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Identify all transport used	1.1 Define boundaries of value chain or part of value chain to be analysed
	1.2 Identify all transport to a site
	1.3 Identify all transport within a site
	1.4 Identify all transport from a site
2 Analyse transport requirements	2.1 Identify current specifications for required transport
	2.2 Identify transport that is not essential to product or process as defined from the perspective of a customer
	2.3 Identify transport arrangements used which are inefficient
	2.4 Determine transport required to increase utility
3 Determine total cost of transport	3.1 Calculate direct financial cost of transport
	3.2 Determine emissions from transport
	3.3 Calculate working capital costs of transport
	3.4 Calculate cost impost of transport which does not meet requirements
	3.5 Calculate costs of transport which does not increase utility
4 Develop strategies for reducing the use of the resource/material	4.1 Rank transport by total costs
	4.2 Rank unnecessary transport by total costs
	4.3 Develop strategies to reduce total transport costs
5 Prepare a recommendation for a resource use reduction strategy	5.1 Consult with key stakeholders
	5.2 Identify strategies required to meet regulatory or

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similar requirements

5.3 Rank strategies by benefit/cost ratio

5.4 Short-list preferred transport improvement strategies

5.5 Prepare recommendations for improving transport

Required Skills and Knowledge

Required knowledge includes:

- value chain and transport within the value chain
- modes of transport used within and external to site
- alternative modes of transport which could achieve same outcomes
- requirements of transport to meet required outcomes (transport specifications)
- waste (muda) as used in competitive manufacturing/lean manufacturing
- utility as a concept and as applied to transport
- transport costs and emissions
- working capital, including inventory costs of transport
- methods of calculation of costs
- strategies for reducing transport and transport costs
- cost-benefit calculation
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- negotiating with relevant stakeholders
- calculating, manipulating and interpreting numerical data, including establishing series, means, correlations and rates of change
- analysing and ranking options
- consulting with technical and operative staff
- preparing recommendations

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to conduct a sustainability related transport audit, including calculation of transport related emissions and preparation of recommendations for improved resource use.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • mapping of transport use to part of value chain to be analysed • applying concept of utility to transport • ranking of transport by cost and utility • developing transport improvement strategies.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Transport	Transport includes: • transport used in a value chain whether by vehicle, ship/boat, train, aeroplane, conveyor or other means
Financial costs	Financial costs include: • purchase, lease, and hire costs and maintenance costs where these are included in a lease or hire agreement
Utility	Utility is: • the economic usefulness of the transport from a customer's perspective i.e. does the transport add value from a customer perspective (e.g. transporting from plant to consumer increases the utility from the customer's perspective whereas moving between one process and another does not)
Transport arrangements	Transport arrangements include: • departure, arrival and waiting times, and choice of equipment, fuel and mode

Inefficient transport	Inefficient transport is:
	• transport which uses more time, fuel or larger capacity of transport than is needed or causes more stock to be held than is necessary, such as:
	  • not travelling by the most direct route
	  • taking more time than necessary
	  • not correctly matching load to capacity of transport vehicle
	  • not correctly matching delivery and pick up times to production requirements

Essential transport	Essential transport is: • the minimum transport requirements needed to transport goods as defined by the customer
Muda cost	Muda cost includes: • transport that does not meet specification required, or that does not increase utility
Unnecessary transport	Unnecessary transport is: • transport which does not increase utility and therefore would be classified as muda or waste in a lean manufacturing analysis

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015014A Develop response to sustainability related regulation

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers identifying responsibilities and developing an appropriate response to schemes regulating sustainability, including carbon and carbon equivalent use and emission. It includes the ongoing monitoring and adjusting of responses to the regulatory environment and organisational situation.

Application of the Unit

This unit applies in organisations that are may be impacted by sustainability regulation. Some possible applications are carbon containment/reduction schemes/regulations or incentives or other schemes that may be implemented. The application of the unit includes Australian and overseas schemes where the organisation is part of an export value chain or is a subsidiary required to report against a scheme covering an overseas parent.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit. Specific units covering these and similar aspects are contained within the MSS40211 Certificate IV in Environmental Monitoring and Technology.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Interpret regulation	1.1 Determine emissions/sustainability issues as defined by the relevant regulation
	1.2 Compare organisation's profile with regulatory definitions/ descriptions
	1.3 Determine impact on the organisation in its current state
2 Develop possible organisation responses to impact	2.1 Determine 'no change' cost of compliance
	2.2 Facilitate the suggestion of alternative responses
	2.3 Determine benefit/cost for feasible alternative responses
	2.4 Compare alternative response to current state impact
	2.5 Rank responses by desirability
3 Select appropriate responses	3.1 Short-list ranked responses
	3.2 Discuss short-listed responses with key stakeholders
	3.3 Determine responses to be implemented and timelines for implementation
	3.4 Develop and overall strategic plan to implement agreed responses
4 Implement agreed responses	4.1 Develop implementation plan for agreed responses
	4.2 Negotiate required resources with relevant stakeholders
	4.3 Negotiate timelines and measures/indicators of success with change stakeholders
	4.4 Acquire and deploy resources required to achieve agreed responses
	4.5 Monitor implementation and take action as required to achieve required responses

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	4.6 Renegotiate with relevant stakeholders as necessary
5 Recommend further improvements	5.1 Measure improvements actually obtained
	5.2 Identify non-compliances with planned improvements
	5.3 Determine additional improvements desirable

Required Skills and Knowledge

Required knowledge includes:

- relevant regulations/legislation
- stakeholders and methodology required to determine organisation's current state and fit compared to regulations/legislation
- brainstorming techniques
- cost-benefit analyses techniques
- methods of dealing with regulatory requirements and the benefits arising from each
- project/improvement planning/scheduling techniques
- process monitoring and critical measures
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- calculating compliance costs
- calculating marginal cost of abatement curve
- negotiating with value chain members, staff and regulators
- solving problems at a strategic level
- communicating across all internal and external levels
- developing implementation plans
- analysing impact of regulations on current and future states

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to recommend organisation response to sustainability related regulations, implement agreed responses and suggest ongoing strategies.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining sustainability regulatory environment for an organisation • identifying a range of possible responses to regulation • analysing and ranking possible responses according to benefit/cost to organisation • consulting with stakeholders to identify agreed response • implementing and monitoring agreed response consistent with regulation and stakeholder purpose.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.

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Guidance information for assessment	

Range Statement

Regulation	Regulation includes: • regulations and legislation as may be in force to regulate emissions or similar • standards (such as AS/NZS ISO 14000 Environmental Management Standards), codes of practice and other sustainability related regulation arrangements
Alternative responses	Alternative responses include: • process, procedural and practice changes to reduce carbon emissions • value chain changes to reduce carbon emissions • carbon trading responses modify cost of compliance • other market operations where relevant • material, component and product changes to reduce emissions/improve compliance

Desirability ranking	Determining desirability ranking includes:
	• regulatory required changes
	• direct dollar benefit/cost
	• customer benefit
	• stakeholder perception:
	  • shareholders
	  • employees
	  • community
	  • financial community
	  • other
	• life cycle improvements

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015015A Evaluate sustainability impact of a process

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers evaluating the impact on sustainability of an entire process (manufacturing, logistics, office or other process) or the product from such a process. It does not specifically address the regulatory requirements for an environmental impact statement.

Application of the Unit

This unit applies to establishing the overall or broad sustainability impact of a process and making recommendations for mitigating negative sustainability impacts. It may apply to value chains beyond the boundary of an organisation, or the entire value chain within an organisation. The unit scope includes products made, services offered, and use of sites by an organisation or part or all of its value chain. This unit covers the application to substantial portions of value chains and may be beyond the boundaries of the organisation. For portions of value chains within an organisation consider MSS014002A Evaluate sustainability impact of a work or process area.

Environmental sensitivities referred to in this unit are at the issue level. The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

If the impact is to be evaluated across a value chain and the extent of the value chain is not known, MSACMS601A Analyse and map a value chain should also be selected.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

This unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Evaluate the value chain for the selected process	1.1 Select portion of the value chain for analysis
	1.2 Identify process steps along the chain
	1.3 Identify the change which occurs at each step
	1.4 Define the interactions with the environment at each step
2 Determine sustainability issues for the process	2.1 Identify environmental sensitivities at each step in the value chain
	2.2 Identify other sustainability issues at each step in the value chain
	2.3 Short-list sustainability issues which will require action to mitigate or eliminate negative sustainability impacts
3 Analyse sustainability issues for the process	3.1 Determine root cause of each short-listed issue
	3.2 Develop possible solutions to root causes
	3.3 Develop alternative mitigation strategies where needed
	3.4 Estimate resources required for solutions and alternative mitigation strategies
	3.5 Rank possible solutions strategies by desirability
	3.6 Produce and present report to stakeholders

Required Skills and Knowledge

Required knowledge includes:

- value chain mapping and analysis with regard to sustainability
- process and changes which occur within the process

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- environmental impacts of materials and energy used/emitted
- environmental sensitivities of all areas impacted by the value chain (and related areas where impact spreads beyond immediate area, e.g. by loss of containment)
- root cause analysis and problem solving
- mitigation strategies
- benefit/cost analyses techniques
- methods of dealing with sustainability issues and the benefits arising from each
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- analysing and prioritising issues
- consulting and negotiating with stakeholders on possible solutions and strategies for sustainability improvement
- using problem-solving techniques, including root cause analysis
- mapping the value chain

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to evaluate the sustainability impact of a whole process or internal or external value chain, determine root cause for sustainability issues and propose and rank solutions.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying steps in the process and portion of manufacturing value chain • determining ecological and sustainability impacts of processes • determining root causes of impacts • evaluating solution and mitigation strategies.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any operational, manufacturing, logistics, administrative, information technology or business process in a manufacturing value chain (e.g. manufacturer, supplier of goods or services or a customer)
Interactions with the environment	Interactions with the environment may include: • drawing physical resources from the environment • releasing materials to the environment (e.g. emissions) • drawing energy from/releasing energy to the environment
Environmental sensitivities	Environmental sensitivities may include: • fragile areas and rare or threatened species • heritage or religious issues • hazardous emissions • regulated emissions or other regulatory issues • community perceptions or other issues

Sustainability issues	Sustainability issues may include:
	• resource footprint (e.g. carbon and water) of product and process
	• current and future availability of raw materials
	• current and future availability of energy
	• waste generation and disposal
	• efficiency of process
	• the extent to which the production process and product affects the environment, including effects on:
	  • climate
	  • quality of local air and water
	  • ecology
	  • noise
	• relationship with the local and broader community (e.g. effect of operations on aesthetic appearance, preservation of heritage, and proximity to schools and religious facilities)
	• extent of regulatory oversight and cost of compliance

Desirability ranking	Desirability ranking includes: • direct dollar benefit/cost • customer benefit • stakeholder perception:

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	• shareholders • employees • community • financial community • other • life cycle improvements

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015016A Implement and monitor reengineering for sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers identifying, implementing and monitoring a reengineering process to achieve a sustainability improvement.

Application of the Unit

This unit applies to production operations that have identified reengineering as a potential strategy for improving sustainability. Where a strategic review of sustainability improvement options is required, MSS015008A Develop strategic sustainability plans, should be selected.

This unit includes the identification of the process for reengineering, the development of the sustainability objectives of the reengineering project, establishment of project objectives, implementation and evaluation.

The reengineering project may involve consultations and participation by customers and suppliers in the value chain.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

This unit does not supply the technical skills for undertaking the engineering alterations, such as installation, commissioning and operation of equipment.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

THis unit contains employability skills

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine the need for reengineering	1.1 Choose a process for improvement
	1.2 Analyse process performance
	1.3 Compare reengineering approach with other process improvement methodologies
	1.4 Confirm the need for reengineering
2 Determine process objectives	2.1 Identify stakeholders in the process
	2.2 Research and define perceived stakeholder benefit from process
	2.3 Translate perceived benefits into product and process specifications
	2.4 Collect current available metrics on process performance
	2.5 Determine metrics for monitoring future sustainability related and other process performance
3 Facilitate reengineering study	3.1 Organise appointment of reengineering team
	3.2 Determine impact on suppliers and customers during and after reengineering
	3.3 Acquire required resources and authorities to proceed
	3.4 Develop descriptions of alternative processes which will deliver required specifications
	3.5 Short-list most likely alternatives
	3.6 Evaluate short-listed alternatives
	3.7 Rank evaluated short-listed alternatives by desirability
4 Implement preferred	4.1 Select preferred option

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option	4.2 Develop implementation plan for preferred option
	4.3 Negotiate required resources with relevant stakeholders
	4.4 Negotiate timelines and measures/indicators of success with change stakeholders
	4.5 Acquire and deploy resources required to achieve agreed responses
	4.6 Monitor implementation and take action as required to achieve required responses
	4.7 Renegotiate with relevant stakeholders as necessary
5 Recommend further improvements	5.1 Measure improvements actually obtained
	5.2 Identify non-compliances with planned improvements
	5.3 Determine additional improvements desirable

Required Skills and Knowledge

Required knowledge includes:

- benchmarking
- process analysis techniques
- process improvement methodologies:
  - kaizen
  - kaizen blitz
  - technical optimisation approaches
  - reengineering
- calculation of cost/benefit
- brainstorming techniques
- cost-benefit analysis techniques
- project improvement planning/scheduling
- process monitoring and critical measures
- root cause analysis and other problem-solving techniques

Required skills include:

- communicating and negotiating with internal and external stakeholders
- analysing equipment operation and processes for sustainability impacts
- brainstorming
- planning implementation of a project

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- undertaking formal problem-solving processes

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to compare reengineering to other options for sustainability improvement, facilitate and implement a reengineering study and suggest further improvements.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • comparing reengineering to other possible solutions to sustainability issues • understanding and collecting metrics on current and future process performance • implementing a reengineering process to achieve desired sustainability objectives • using of benefit/cost and brainstorming techniques appropriately.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Process	Process may include: • any manufacturing, administrative, information technology or business process in a manufacturing value chain
Process performance	Process performance must include: • sustainability related performance and should also include other relevant performance measures Analysis may include: • benchmarking comparisons • comparison with theoretical performance • comparisons with regulatory requirements • examination of operational and maintenance records • consultation with operational and maintenance staff to identify informal history (e.g. excessive effort in 'work arounds', and making it work in spite of the system) • conflicts in the organisation • an extremely high frequency of meetings • excessive use of non-structured communication (memos and emails)
Process improvement methodologies	Process improvement methodologies may include: • kaizen • kaizen blitz • technical optimisation approaches • reengineering, including new plant and equipment, modification of existing plant and equipment and changes to specification of product or process
Customer	Customer includes: • the user of what the process produces
Product	Product includes: • goods • services

Desirability ranking	Desirability ranking includes:
	• direct dollar benefit/cost
	• customer benefits
	• stakeholder perception:
	  • shareholders
	  • employees
	  • community
	  • regulators

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	• financial community • other • life cycle improvements • flexibility to adapt to future needs

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS015017A Develop regulated sustainability reports

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers drafting reports required to meet government schemes or regulations or similar sustainability regulatory reporting requirements. These may include the interpretation of technical data into the information required.

It includes the development of formats or internal reporting templates to meet the public needs of the organisation.

Application of the Unit

This unit applies in organisations that are impacted by sustainability related legislation and regulations, such as environmental legislation and carbon pollution regulations, incentives or schemes.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility.

Information required for the report may be gathered by the individual or as part of a team. The unit does not cover undertaking environmental or other technical analysis to gain required information. However, there is a requirement to present and organise data. The complexity of this requirement will vary according to the type and scale of the organisation's processes. Where required, appropriate mathematics and statistics units should be selected from the MEM05 Metal and Engineering Training Package or other appropriate Training Package.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine data requirements	1.1 Identify current thresholds required for reporting in each category
	1.2 Locate sources of required data
	1.3 Identify measurement and calculation techniques required to meet reporting obligations
	1.4 Establish systems to collect and process required data and information
2 Monitor data collection and processing	2.1 Develop procedures and templates for data collection and processing
	2.2 Identify key indicators of data collection and processing proceeding according to plan
	2.3 Identify data collection/processing which is not to requirements
	2.4 Take appropriate action to bring data collection/processing back to requirements
3 Draft report	3.1 Determine regulatory report requirements
	3.2 Negotiate other organisation requirements for report
	3.3 Develop a report format which complies with requirements
	3.4 Determine required information from available data
	3.5 Collate all required data and information
	3.6 Prepare any required charts, tables and other graphics
	3.7 Draft report to meet agreed needs and standards
	3.8 Discuss draft report with key stakeholders
	3.9 Identify key action items arising from report
4 Complete regulatory	4.1 Complete the regulatory report

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report	4.2 Obtain required authorisations and submit report according to procedures 4.3 Prepare recommendations for improvements to regulatory reporting process 4.4 Prepare improvement recommendations for identified action items 4.5 Submit recommendations for implementation in accordance with organisation's procedures

Required Skills and Knowledge

Required knowledge includes:

- National Greenhouse and Energy Reporting (NGER) Act 2007 and other current reporting requirements (or their equivalent)
- graphics and other means of presenting data
- report writing and grammar
- data sources both internal to and external from the organisation
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- negotiating with stakeholders
- collating, interpreting, and presenting statistical data sets and other numeric information, including data series, means and averages
- presenting data in an appropriate manner
- writing technical and complex reports
- working with other people to achieve the outcome

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to develop and complete reports to meet sustainability related regulatory requirements, including data collection and analysis.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying information required for regulated report, including sources and any additional measurement or calculation required to meet report content requirements • establishing data collection procedures • drafting regulated report and obtaining appropriate stakeholder approvals • completing report to requirements.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Reporting category	Report will generally require reporting of activities above a defined threshold. Reporting categories may include: • greenhouse gas emissions • energy production • energy consumption • waste generation and disposal • water use, sources and disposal • other information specified under legislation
Threshold	Threshold is the level above/below which reporting is required
Sources of data	Sources of data means where the data comes from and may include, but is not limited to: • existing reports (internal and external) • process metrics • purchasing, sales and accounting data • test results and other measurements specifically undertaken to produce the required data
Measurement and calculation techniques	For greenhouse gases these are currently defined by the Kyoto protocol and may in the future be defined by replacement protocols or directly by regulation. Measurement and calculation techniques may be defined by: • regulations • Australian (or other) standards • industry codes and protocols • standard mathematical, statistical, science or other techniques for converting raw data into the required information
Required authorisations	Required authorisations means those procedures and 'sign-offs' which the organisation or the regulation requires before releasing the report

Unit Sector(s)

Sustainability

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Custom Content Section

Not applicable.

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MSS015018A Inform and educate organisation and community representatives on sustainability issues

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers explaining and providing advice on sustainability issues and processes to organisation and community representatives, including employees, managers, clients, suppliers and the local and wider community.

Application of the Unit

This unit applies inside organisations and their value chains (e.g. supplier of goods or services or customer) and applies to individuals who must inform and educate representatives of their own organisation, members of their organisation's value chain and community representatives on sustainability issues.

The unit has been developed with manufacturing operations as a focus. However, because of the range of organisations in a typical manufacturing value chain it may also be applied to other types of organisations.

Advice provided would be of a general nature and would not cover detailed technical interpretation of test results or specialist financial, engineering or legal advice.

It would typically be undertaken by a manager or technical specialist who had a major responsibility for sustainability as part of a broader work role, or sustainability may be their primary work responsibility. The manager or technical specialist may undertake this alone or as part of a team.

The technical measurement of operational performance or measurement of emissions or other environmental impact is not covered by this unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1 Determine sustainability information or advice requirements	1.1 Determine need for sustainability information dissemination
	1.2 Assess type and level of information required to be communicated
	1.3 Determine if information release is covered by special provisions
	1.4 Determine timing and distribution requirements for communication of information
2 Provide sustainability related information	2.1 Acquire or produce required information in an appropriate format
	2.2 Ensure documentation is accurate and information sources are suitable for ongoing reference
	2.3 Ensure information covers options for improving sustainability
	2.4 Provide relevant information through meetings or use of appropriate media
	2.5 Provide an opportunity for representatives to confirm understanding and seek clarification
3 Provide clarification on sustainability issues	3.1 Determine if assistance/advice is required from a specialist
	3.2 Undertake an inspection of site or equipment to clarify concern or issue if required
	3.3 Assist organisation or community representatives to interpret sustainability information
	3.4 Assist representatives to develop and implement sustainability improvement strategies

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Required Skills and Knowledge

Required knowledge includes:

- basic sustainability principles
- value chain concepts
- significant sustainability issues, including climate change, carbon pollution, waste generation and control
- principles of energy and water conservation
- precautionary principle
- sustainability and environmental legal context
- principles of biological and ecological diversity
- methods of interpreting and presenting data
- sources of relevant data and information in own organisation and from public sources
- AS/NZS ISO 14000 Environmental Management Standards

Required skills include:

- explaining sustainability concepts and processes, including implications for individuals, organisations and the local and wider community
- adjusting information detail and content for needs of individuals and audiences with different degrees of prior knowledge of sustainability
- liaising with technical and professional experts
- analysing reports and other information for sustainability implications
- relating sustainability and environmental concepts to specific locations, processes, logistics, material usages and products within a manufacturing value chain
- analysing the regulatory environment as it applies to an organisation, site or process and determining implications for communication of sustainability related information
- communicating and negotiating to identify key sustainability issues and options

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Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to explain and present sustainability related information to a range of internal and external individuals, including representatives of the community, suppliers, customers and other organisations.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • conducting consultations with stakeholders who need sustainability information • matching sustainability information need with commercial and regulatory requirements • presenting information at different levels of complexity and in different formats • analysing documentation for sustainability implications and information.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Organisation and community representatives	Organisation and community representatives may include:
	• employees and managers in own organisation
	• suppliers
	• customers
	• other members of a value chain, including:
	  • logistics suppliers
	  • professional support services, including legal, financial and engineering
	  • contractors
	  • training providers
	• local, regional and national community representatives

Need for sustainability information dissemination	The need for sustainability information dissemination may be determined by means such as: • discussions with organisation representatives • discussions with community representatives • examination of current and past requests for information
Information covered by special provisions	Information covered by special provisions may include: • information required to be released under Acts or regulations • information required under supplier or customer contracts • industry codes, covenants and standards • commercial in confidence information • information requiring special clearances before release

Sustainability related information and concepts	Sustainability related information and concepts may include:
	• definitions of sustainable development
	• sustainability related philosophical concepts, including:
	  • precautionary principle
	  • intra- and inter-generational equity
	  • inter-regional and inter-country equity
	• air, water and soil contamination
	• energy use and conservation
	• climate change, including greenhouse gases
	• overpopulation relative to food supply

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	• effects of uneven population distribution
	• distinction between renewable and non-renewable resources
	• resource footprint
	• consumption of resources, including:
	  • reasons for use in the value chain
	  • rate of use
	  • impact on environment and ecology at both local and global level
	  • alternative resources
	  • efficiency of extraction and use of resources
	• concepts of carbon accounting and carbon equivalence in resource consumption
	• generation and disposal of solid and liquid waste
	• conservation of biological and ecological diversity
	• community and government expectations on use of technology
	• environmental and sustainability related legislation and regulations,
	• inclusion of sustainability and environmental values in cost structures
	• general sustainability issues

Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017001A Analyse and determine organisational risk areas in sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the analysis of an organisation's interactions with its environment, the specifics of the local situation and determining risks and vulnerabilities (hot spots) for close monitoring or action. It may be applied to an entire organisation, part of a large organisation or part/all of a value chain.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field,
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the analysis of an organisation's interactions with its environment through an application of the principles of sustainability and an understanding of climate change and other significant sustainability issues, such as resource depletion. The organisations environment, for the purpose of this unit, is considered to include the ecology it impacts, the economic impacts on the organisation and the social impacts of the organisation.

This unit covers the identification of items which have the potential for a major sustainability impact, and so require some response from the organisation. It does not include the implementation of that response (see MSS017004A Lead sustainable strategy deployment).

This unit would typically be undertaken by a manager or senior technologist who has significant responsibility for sustainability in their work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Analyse interactions with organisation's environment	1.1	Process map operation for chosen portion of value chain
		1.2	Determine ecological interactions for each process step
		1.3	Determine social interactions for each process step
		1.4	Determine economic interactions for each process step
		1.5	Analyse overall interactions for chosen portion of value chain
2	Determine the significance of each impact	2.1	Determine sustainability issues of particular relevance to the chosen portion of the value chain
		2.2	Analyse ecological impacts
		2.3	Analyse social impacts
		2.4	Analyse economic impacts
		2.5	Analyse for interactions between individual impacts
		2.6	Rank each impact by significance
3	Develop an	3.1	Analyse the causal tree for each significant impact

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	appropriate response for each interaction	3.2	Analyse mitigation methods available
		3.3	Determine an appropriate response for each significant impact
		3.4	Determine aggregate impact of all 'non-significant' impacts
		3.5	Determine if additional response is required
4	Communicate with relevant stakeholders	4.1	Identify relevant stakeholders
		4.2	Determine stakeholder information needs and wants
		4.3	Analyse data which may be appropriate to communicate with stakeholders
		4.4	Prepare and disseminate information to stakeholders, as appropriate
		4.5	Negotiate solutions with stakeholders, as required
5	Communicate required responses as appropriate	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate reports and recommendations
		5.3	Pitch reports and recommendations as appropriate
		5.4	Brief appropriate persons as required by determined responses
		5.5	Finalise appropriate recording

Required Skills and Knowledge

Required skills
Required skills include: • process mapping of goods and/or services • interpreting specifications, operating procedures, manuals, regulations and other complex

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documents • consulting and negotiating with internal and external stakeholders • analysing and problem solving, including determination of root cause • interpreting and manipulating data, including establishing series, means, correlations and rates of change • drafting formal reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • causes of climate change, impacts of greenhouse gases • sources and impacts of pollution and other ecological degradation and methods of eliminating, controlling or reducing them • causes of adverse social impacts and methods of eliminating, controlling or reducing them • causes of adverse economic impacts and methods of eliminating, controlling or reducing them • root cause analysis • hierarchy of hazard control and its application to sustainability hazards • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse an organisation's interaction with the environment, determine impacts, and suggest responses to minimise risks and vulnerabilities.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • analysing sustainability susceptibilities for a chosen portion of a value chain • identifying appropriate responses • communicating the above, as appropriate.

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Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
Process mapping	Process mapping is a technique for visualising/drawing a set of interrelated work activities characterised by a set of inputs and value-added tasks that produce a set of outputs. It applies to any process producing a good or a

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	service
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes: • sections internal or external to the organisation
Interactions with the environment	Interactions are value-free statements of how each step, or the entire process, interact with the ecology, society and the organisation's economy
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as: • state of the economy • stage of the business cycle • product improvement/life cycle, such as: • organisational risk of loss of sales due to consumer preference/economic opportunity for more sustainable products • competitors meeting this market, • consumer preferences not to use companies with poor sustainability credentials
Significance of impact	Significance of impact includes: • permanent loss or degradation • loss or degradation which inhibits use by the

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	following generation • temporary degradation requiring remediation • temporary degradation which is self-remediating • speed of change/degradation/loss
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • capitalising on revealed opportunities • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017002A Determine process loss through mass or energy balancing

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the analysis of a process to determine loss of resources by the application of the first law of thermodynamics (more commonly known as mass and energy balancing). It includes the selection of mass or energy balancing or both as appropriate to the type of processes being examined and may be applied to an entire process, part of a large process, or part/all of a value chain.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the analysis of a mass (material) and energy (usually heat or motive force) flows through a process to determine overall mass and energy efficiency, losses which occur through the process and how much loss occurs in each part of the process. This is achieved by the application of the techniques of mass balancing, energy balancing and combined mass and energy balancing. The application of this unit is especially suitable where high volumes of materials or large amounts of energy are used in a production process. The unit may also apply to other large energy or materials use processes in the value chain, such as logistics and transport.

This unit will lead to the identification of parts of the process which have the greatest resource loss/lowest resource use efficiency and so provides the basis for eliminating or reducing this loss and improving this efficiency. It does not include the implementation of that response (see MSS017004A Lead sustainable strategy deployment).

This unit would typically be undertaken by a manager or senior technologist who has significant responsibility for sustainability in their work role.

Skills covered by this unit may be applied individually or in a team context.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Acquire required data	1.1	Identify system to be analysed
		1.2	Define appropriate boundaries for this system
		1.3	Identify relevant data which is available for the system and its subsystems
		1.4	Identify required data which is not currently available
		1.5	Negotiate with relevant stakeholders to obtain data which is not currently available
		1.6	Acquire necessary and appropriate data
2	Calculate resource efficiency/loss	2.1	Undertake mass/energy balance over system
		2.2	Identify subsystems making greatest contributions to loss by mass/energy balances over selected subsystems
		2.3	Calculate sustainability impact of identified losses
		2.4	Calculate mass/energy efficiencies of system and analysed sub-systems

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3	Prepare recommendations	3.1	Investigate sub-systems responsible for significant loss
		3.2	Determine currently available responses
		3.3	Determine required longer term responses
		3.4	Draft recommended responses in appropriate form
4	Communicate with relevant stakeholders	4.1	Identify relevant stakeholders
		4.2	Determine stakeholder information needs and wants
		4.3	Analyse data which may be appropriate to communicate with stakeholders
		4.4	Prepare and disseminate information to stakeholders, as appropriate
		4.5	Negotiate solutions with stakeholders, as required
5	Communicate required responses as appropriate	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate reports and recommendations
		5.3	Pitch reports and recommendations as appropriate
		5.4	Brief appropriate persons as required by determined responses
		5.5	Finalise appropriate recording

Required Skills and Knowledge

Required skills
Required skills include: • interpreting specifications, operating procedures, manuals, regulations and other complex

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documents • consulting and negotiating with internal and external stakeholders • analysing and problem solving, including determination of root cause • data acquisition • interpreting and manipulating data, including the solving of simultaneous equations, the use of tie elements and the conversion of one form of energy into another • drafting formal reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • root cause analysis • relevant legislation, regulation and protocols, government incentives and other initiatives • first law of thermodynamics • defining boundaries for systems subject to mass/energy balancing • required data, sources of data from process, and use of data proxies, where necessary • mass balancing techniques • energy balancing techniques, including the use of tables of thermodynamic properties (steam tables), and the use of specific heat capacity and specific latent heat • combined mass/energy balancing techniques, including the use of heats or reaction/dissolution • methods of reducing resource losses for process and equipment

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse processes or part or all of a value chain using mass and/or energy balancing as appropriate.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • undertaking a mass and an energy balance (which may be on different systems) or a combined mass/energy balance

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	• identifying appropriate responses • communicating the above as appropriate
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
System	A system is that process, or part of a process, which has been selected for analysis. It includes all the steps in the

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	process which fall within the defined boundary. These steps have been referred to as ‘sub-systems above. The system may be any part of the value chain or the entire value chain
Sub-system	A sub-system is part of the system which may be chosen for separate analysis or study
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes: • sections internal or external to the organisation
Mass/energy balancing	• Mass balancing is an analysis technique which allows for the calculation of mass flows and consumption through a process and losses of mass from the system/product • Energy balancing is an analysis technique which allows for the calculation of energy flows and consumption through a process and the losses of energy from the system/product • Mass and energy balancing may be undertaken as separate activities or in some circumstances as a combined mass/energy balance
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017003A Identify and respond to external sustainability factors for an organisation

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the recognition of external sustainability related factors which are relevant to the organisation and then developing an appropriate response. It may be applied to an entire organisation, part of a large organisation, or part or all of a value chain.

Application of the Unit

This unit is a vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the scanning of factors which influence an organisation and its environment, identifying those which relate to sustainability and require a response or where a response would benefit the organisation and then developing or organising an appropriate response. The organisations environment, for the purpose of this unit, is considered to include the ecology it impacts, the economic impacts on the organisation and the social impacts of the organisation.

This unit will lead to the identification of sustainability responses by the organisation in response to external factors. It does not include the implementation of these responses, (refer to *MSS017004A Lead sustainable strategy deployment*).

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Monitor external environment for sustainability related factors	1.1	Monitor relevant government legislation and regulation
		1.2	Monitor relevant government initiatives and programs
		1.3	Monitor customer expectations
		1.4	Monitor market trends and competitor actions
		1.5	Monitor expectations of communities impacted by organisation
		1.6	Identify factors which are relevant to the organisation
		1.7	Rank factors by significance
2	Develop alternative responses to external factors	2.1	Agree which factor or factors should be responded to now
		2.2	Determine minimum response required
		2.3	Compare impact of factors with organisation’s strategic direction
		2.4	Develop alternative responses which fit organisations strategic direction
		2.5	Analyse sustainability impacts for each practical response

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		2.6	Consult relevant stakeholders
		2.7	Rank possible responses
3	Communicate with relevant stakeholders	3.1	Identify relevant stakeholders
		3.2	Determine stakeholder information needs and wants
		3.3	Analyse data which may be appropriate to communicate with stakeholders
		3.4	Prepare and disseminate information to stakeholders, as appropriate
		3.5	Negotiate solutions with stakeholders, as required
4	Prepare response for factor or factors	4.1	Agree on response to be progressed now
		4.2	Prepare business case for response
		4.3	Agree possible future action for other factors
5	Communicate required responses as appropriate.	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate reports and recommendations
		5.3	Pitch reports and recommendations, as appropriate
		5.4	Brief appropriate persons as required by determined responses
		5.5	Finalise appropriate recording

Required Skills and Knowledge

Required skills include:

- monitoring of media, government gazettes, sales staff and customer feedback, share market

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analyses and other sources • interpreting specifications, operating procedures, manuals, regulations and other complex documents • consulting and negotiating with internal and external stakeholders • analysing and problem solving, including root cause analysis • interpretation and manipulation of data • drafting reports and recommendations
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • current actual and possible sources of external sustainability factors relevant to the organisation • possible responses for improving sustainability • root cause analysis • hierarchy of hazard control and its application to sustainability hazards • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to monitor the organisation's external environment for sustainability related factors that will, or are likely to, impact on the organisation, analyse risks and determine appropriate responses.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • recognition of an relevant stimulus • development of appropriate responses to the stimulus • determining which response(s) proceeds • communicating the above as appropriate

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Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
Factors	Factors refer to any force external to the organisation relating to sustainability which may encourage it to act in a particular way and include: • government (at any level) legislation or regulation

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	• government (at any level) direct action programs or similar • government (at any level) incentives or similar • customer expectations • community expectations • market trends • competitor actions • other factors
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes: • sections internal or external to the organisation
Response	Response may include: • any action which improves the sustainability of an organisation, its product or its value chain and which addresses the issues raised by the stimulus
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as: • state of the economy • stage of the business cycle
Significance of impact	Significance of impact includes: • permanent loss or degradation

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	• loss or degradation which inhibits use by the following generation • temporary degradation requiring remediation • temporary degradation which is self-remediating • speed of change/degradation/loss
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques. such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017004A Lead sustainable strategy deployment

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers leading the deployment of sustainable strategy for an entire organisation, part of a large organisation, or part or all of a value chain. It includes the linking of sustainability strategy with business strategies and the planning, communication and deployment of the strategy.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the integration of recommendations for sustainability improvements into the organisations strategic sustainability goals and plans and then the facilitation of the implementation of sustainability improvements. The organisations environment, for the purpose of this unit, is considered to include the ecology it impacts, the economic impacts on the organisation and the social impacts of the organisation.

Strategy deployment as described by this unit is also known as *'hoshin kanri'* in enterprises following lean manufacturing principles and is a process that ties senior leadership and business strategy to enterprise-wide business improvement practices.

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Develop sustainability strategy	1.1	Examine existing organisation vision and strategy for impact on sustainability, including any currently identified sustainability goals and objectives
		1.2	Identify external sustainability best practice
		1.3	Examine current operations for economic, social and environmental factors relevant to sustainability for the organisation
		1.4	Liaise with relevant stakeholders
		1.5	Develop appropriate sustainability vision and goals
		1.6	Develop sustainability strategy
		1.7	Obtain required approvals
2	Examine proposals for sustainability improvement	2.1	Communicate sustainability strategy and request improvement proposals
		2.2	Examine fit of proposals with sustainability strategy
		2.3	Determine possible synergies between proposals
		2.4	Have proposals modified to achieve better strategic outcomes, as appropriate
		2.5	Facilitate the development of integrated implementation plans for selected proposals
		2.6	Facilitate the provision of resources required for

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			implementation
3	Facilitate implementation of selected proposals	3.1	Ensure appropriate project plans have been developed
		3.2	Ensure appropriate metrics are identified and will be collected
		3.3	Facilitate any necessary capability development
		3.4	Organise for appropriate controls and feedback
		3.5	Ensure appropriate improvement processes are implemented
4	Lead periodic review of sustainability improvements	4.1	Ensure appropriate data is available
		4.2	Convene appropriate review process
		4.3	Validate current strategy
		4.4	Validate current tactics
		4.5	Review progress and impacts of current projects
		4.6	
		4.7	Develop required changes Facilitate implementation of required changes
5	Communicate as appropriate	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate communications
		5.3	Communicate as appropriate
		5.4	Finalise appropriate recording

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Required Skills and Knowledge

Required skills
Required skills include: • conducting SWOT analysis • conducting cause and effect analysis and diagrams • process mapping • applying formal problem-solving techniques, including root cause analysis • interpreting specifications, operating procedures, manuals, regulations and other complex documents • communicating, consulting and negotiating with internal and external stakeholders • analysing and problem solving • interpreting and manipulating data • drafting reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • causes of adverse social impacts and methods of controlling/reducing them • causes of adverse economic impacts and methods of controlling/reducing them • causes of adverse ecological impacts and methods of controlling/reducing them • principles of strategy deployment*/hoshin kanri* • development of vision, mission and strategy • root cause analysis • hierarchy of hazard control and its application to sustainability hazards • sustainability hierarchy • project management principles and the management of multiple related projects • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to lead sustainable strategy deployment across the whole organisation or major part of a large

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	organisation in a manner consistent with the organisation's vision and business strategy.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • development of sustainability strategy • facilitating the implementation of sustainability improvements • reviewing the progress towards goals and the fit with external forces • communicating the above as appropriate
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes sections internal or external to the organisation
Current operations	Current operations includes, but is not limited to: • production • maintenance • logistics and warehousing • administration and human resources • client/customer, contractor and supplier liaison and administration
Develop	Develop means to: • develop a new, or improve an existing process, product or service
Sustainability strategy	Sustainability strategy includes: • scope • timeline • key performance indicators (KPIs) • budget
Required changes	Required changes include: • new/modified metrics, where required • changes resulting from kaizen • data feeding into kaizen
Kaizen	Kaizen is continuous improvement of an entire value stream or an individual process to create more value with less waste
Convene periodic review process	Convening may mean any, some or all of:

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	• a formal or informal meeting • a series of meetings • a virtual meeting/series of meetings • an electronic interchange • other form of interchange Periodic reviews are in addition to kaizen and may include: • reviews to targets (e.g. against set KPIs) • reviews to external environment which may include techniques, such as: • SWOT analysis • search conference • Delphi technique
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as: • state of the economy • stage of the business cycle
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end

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	of pipe' solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017005A Manage a major sustainability non-conformance

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the response to, and management of, a major sustainability non-conformance which may have arisen through the action, or non-action, of the organisation or its value chain members, or due to a change in the external environment. A major non-conformance is one which could have severe business impacts. It may be applied to an entire organisation, part of a large organisation, or part or all of a value chain.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the recognition of a major non-conformance and then the devising and implementation of a strategy and tactics to contain the situation, not allowing it to accelerate or cascade and minimise the adverse consequences while doing what can be done to remedy the situation. The organisation's environment, for the purpose of this unit, is considered to include the ecology it impacts, the economic impacts on the organisation and the social impacts of the organisation.

Typical situations might include a:

- process or equipment failure somewhere along the value chain which has the potential to cause adverse sustainability impacts
- change in legislation or regulation which will see the organisation in breach
- change in requirements from a customer
- change in supply quality from a supplier
- social attitude change which affects in either a positive or negative manner business prospects or the business operating environment.

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Determine extent and nature of non-conformance	1.1	Determine commencement, type and expected duration of non-conformance
		1.2	Liaise with internal stakeholders to determine impact
		1.3	Liaise with value chain members to determine impact
		1.4	Determine impact on current operations and order fulfilment
		1.5	Determine impact of non-conformance on local community and other stakeholders
		1.6	Determine regulatory implications of non-conformance
		1.7	Summarise impact on organisation and value chain member's viability
2	Determine priorities and actions	2.1	Develop possible responses appropriate to the situation
		2.2	Determine possible timing of possible responses
		2.3	Identify required resources for the responses

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			developed
		2.4	Evaluate possible responses and select/short-list responses
		2.5	Select response and organise resources, as appropriate
3	Identify information needs	3.1	Determine regulatory compliance needs
		3.2	Determine the information needs of other stakeholders
		3.3	Identify the sources of required information
		3.4	Arrange to collect required information
		3.5	Report information to stakeholders, as appropriate
		3.6	Arrange for updating of information disseminated on a timely basis, as appropriate
4	Implement immediate response	4.1	Initiate responses and establish data and other information collection procedures
		4.2	Analyse data and other information as it comes to hand
		4.3	Determine progress of responses to achieving required outcomes
		4.4	Modify responses as required to better achieve desired outcomes
5	Plan for conformance	5.1	Determine root cause of non-conformance
		5.2	Determine impacts on sustainability strategy and tactics
		5.3	Develop plan to ensure continued conformance
		5.4	Initiate implementation of plan
		5.5	Monitor implementation of plan and take

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			appropriate action
6	Conclude and review response	6.1	Conduct a debrief and complete reports, as required
		6.2	Evaluate and review response and procedures
		6.3	Evaluate and document effectiveness of the response function and its interaction/communication with stakeholders
		6.4	Recommend improvements to prevent a recurrence and improve response for other non-conformances
		6.5	Communicate reports, as appropriate

Required Skills and Knowledge

Required skills
Required skills include: • conducting situation analysis • interpreting and manipulating data • prioritising • determining and managing risk • applying decision making in a complex environment, including contingency assessment, and adjustment of decision process to match changes in speed, scope or complexity of non -conformance • communicating complex information at all levels • applying formal problem-solving techniques, including root cause analysis • consulting and negotiating with internal and external stakeholders • drafting reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • causes of adverse ecological impacts and methods of controlling/reducing them

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- causes of adverse social impacts and methods of controlling/reducing them
- causes of adverse economic impacts and methods of controlling/reducing them
- root cause analysis
- hierarchy of hazard control and its application to sustainability hazards
- sustainability hierarchy
- relevant legislation, regulation and protocols, government incentives and other initiatives
- risk analysis and its application to sustainability risks
- customer needs as distinct from wants
- sources of additional resources

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to plan for sustainability related non-conformances and implement appropriate responses to non-conformances, including establishing priorities for immediate response and processes to establish root cause of the non-conformance.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • analysing the situation • applying an appropriate quick fix • implementing an appropriate long term response • communicating the above as appropriate
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.

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Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes sections internal or external to the organisation.
Impact of non-conformance	Impact of non-conformance may have a wide range which might include: • negligible impact • fines or other organisation legal penalties • personal fines, jail terms or other personal penalties • court litigation or similar • remediation costs • loss of market share • loss of brand viability • loss of licence to operate

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Other stakeholders	Other stakeholders may include, but are not limited to: • regulatory bodies, such as local councils and environmental protection agencies • customers/clients • suppliers • service suppliers
Responses	Responses include: • the resources used in reaction to the non-conformance as well as the actual process/method of the response
Immediate response	Immediate response may not address long-term issues but simply aims to control the current situation and prevent escalation
Plan for conformance	Plan for conformance is to resume normal operations in such a way that there is sustainability conformance either because: • the temporary situation has been corrected • the process has been adapted to the permanent change in the environment
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as: • state of the economy

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	• stage of the business cycle • other issues, such as those identified by AS/NZS ISO 14000 Environmental Management Standards
Significance of impact	Significance of impact includes: • permanent loss or degradation • loss or degradation which inhibits use by the following generation • temporary degradation requiring remediation • temporary degradation which is self-remediating • speed of change/degradation/loss
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017006A Identify and improve sustainability interactions with the community

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the identification of the impacts on the community of current or future sustainability related actions of the organisation and its value chain and the implementation of measures to make those interactions more positive. It also includes assessing the sustainability impact back on the organisation and its value chain members of actions by the community. The unit may be applied to an entire organisation, part of a large organisation, or part or all of a value chain.

Application of the Unit

This unit is a vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the examination of an organisation's and its value chain's interactions with the community, including the identification of key communication channels and people, and an understanding of sustainability issues from their perspective. The organisations environment, for the purpose of this unit, is considered to include the ecology it impacts, the economic impacts on the organisation and the social impacts of the organisation.

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Determine sustainability interactions with the community	1.1	Process map operation for the chosen portion of value chain
		1.2	Determine sustainability related impacts on the community for each process step
		1.3	Determine overall impacts on the community from the portion of the value chain as a whole
		1.4	Determine overall impacts on the community from the complete value chain
2	Engage with the community	2.1	Determine any known community issues and actions which may be relevant to value chain
		2.2	Determine impact of community issues and actions on the sustainability of the organisation and its value chain
		2.3	Identify key community groups, representatives and opinion influencers
		2.4	Determine best strategy for engagement with the community on sustainability issues
		2.5	Implement strategy to define community sustainability issues with the organisation and value chain
		2.6	Rank issues by importance to the community and organisation
		2.7	Report issues and rankings back to appropriate internal stakeholders

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3	Compare issues raised with impacts determined	3.1	Select issues for action based on rankings and internal stakeholder feedback
		3.2	Determine root cause of selected issues
		3.3	Determine regulatory impact of issues and possible responses
		3.4	Develop an appropriate response for selected issues Explore alternative methods of addressing selected issues
		3.5	Categorise alternative methods
4	Negotiate acceptable solutions	4.1	Negotiate solutions acceptable to the community, the organisation and value chain members
		4.2	Agree a timeline for action and indicators of progress
		4.3	Identify issues where no short-term resolution is achievable
		4.4	Establish agreed mechanism for ongoing monitoring of progress by the community
		4.5	Record this in appropriate manner and promulgate to relevant stakeholders
5	Monitor and report progress of agreed solutions	5.1	Ensure projects are initiated as agreed
		5.2	Collect agreed metrics or other indicators
		5.3	Take appropriate action if solutions are not delivering as anticipated
		5.4	Maintain dialogue with community as agreed
		5.5	Complete appropriate recording and reporting

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Required Skills and Knowledge

Required skills
Required skills include: • process mapping • interpreting specifications, operating procedures, manuals, regulations and other complex documents • communicating, consulting and negotiating with internal and external stakeholders • analysing and problem solving, including root cause analysis • interpreting and manipulating data, including establishing series, means, correlations and rates of change • drafting reports • establishing and maintaining effective dialogue with stakeholders
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • causes of adverse ecological impacts and methods of controlling/reducing them • causes of adverse social impacts and methods of controlling/reducing them • causes of adverse economic impacts and methods of controlling/reducing them • root cause analysis • hierarchy of hazard control and its application to sustainability hazards • sustainability hierarchy • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks • community benefits offered by the organisation/its value chain

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to analyse and negotiate the sustainability related impacts of an organisation on the community and the impact back on the organisation and its value chain of sustainability related actions of the community.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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evidence required to demonstrate competency in this unit	competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • identifying interactions with the community that are sustainability related • defining and analysing impact of the interactions on the organisation and all or part of the value chain • developing and following through on ways of reducing adverse impacts/improving positive impacts • communicating the above as appropriate
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • Survival of the ecology/physical environment (to manage the impact of the business to ensure the

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	survival of the physical environment) • Economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • Social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)
Process Mapping	Process mapping is a technique for visualising/drawing a set of interrelated work activities characterised by a set of inputs and value-added tasks that produce a set of outputs. It applies to any process producing a good or a service
Portion of the value chain	Value chain is the sequence of activities that a firm undertakes to create value/product (good or service). Portion of the value chain includes sections internal or external to the organisation
Community	Community may include: • residents living in the area of the value chain • people who use amenities in the area of the value chain • people who work near the value chain • employees of the value chain or the organisation • other organisations in the area of the value chain • general community
Amenities	Amenities may include: • roads and public transport • waterways • parks and gardens • public facilities, such as halls, libraries, shopping centres and other facilities open to the public
Interactions	Interactions on or from the community may include: • any sustainability related interaction external to the value chain. It may include a perceived impact
Importance to the community	Importance to the community may be based on: • significance of impact • importance perceived by a community member or organisation
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as:

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	• endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • perceived or actual negative impact on the health of individuals in the community • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as: • state of the economy • stage of the business cycle
Significance of impact	Significance of impact includes: • permanent loss or degradation • loss or degradation which inhibits use by the following generation • temporary degradation requiring remediation • temporary degradation which is self remediating • speed of change/degradation/loss
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

Custom Content Section

Not applicable.

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MSS017007A Design for sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the designing of a new product, or the redesigning of an existing product as a sustainable product or to improve its sustainability. It may be applied to a physical product, a service or some other type of 'product'.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field,
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the analysis of the benefit received by the consumer and then an examination of how best this benefit can be delivered to maximise both the benefit and the sustainability of this benefit. It includes an analysis of the cradle to grave/cradle to cradle impacts of the product and the various sustainability impacts along the value chain.

This unit will lead to the design specification for a sustainable/more sustainable product. It does not include the implementation of that design.

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Define the benefit received by the customer	1.1	Select an existing or potential new product for analysis
		1.2	Determine who the customers are for the product
		1.3	Determine uses of product by customers
		1.4	Analyse the benefits received by the customer from using the product
		1.5	Define and rank the benefits received
		1.6	Validate benefits in an appropriate manner
2	Develop alternative ways of delivering benefit	2.1	Brainstorm alternative methods of delivering required benefits
		2.2	Brainstorm related benefits which may also be able to be delivered
		2.3	Analyse sustainability impacts of each alternative
		2.4	Consult with relevant stakeholders, as appropriate
		2.5	Rank alternatives by sustainability
		2.6	Prepare an initial business case for top ranked alternatives
3	Develop product and process design	3.1	Develop product design specification for alternatives most likely to be implemented
		3.2	Determine likely production process for alternatives most likely to be implemented

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		3.3	Analyse life cycle sustainability for alternatives most likely to be implemented
		3.4	Select alternative to develop
		3.5	Consult with relevant stakeholders, as appropriate
		3.6	Confirm selected alternative does deliver key customer benefits
4	Confirm design for selected alternative	4.1	Develop and document product specification
		4.2	Develop and document key production process parameters
		4.3	Consult with relevant stakeholders, as appropriate
		4.4	Prepare business case for implementing selected alternative
		4.5	Negotiate solutions to value chain issues caused by changed design
5	Communicate required responses as appropriate	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate reports and recommendations
		5.3	Pitch reports and recommendations, as appropriate
		5.4	Brief appropriate persons as required by determined responses
		5.5	Finalise appropriate recording

Required Skills and Knowledge

Required skills
Required skills include: • using lateral thinking techniques

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• conducting market research • writing and interpreting specifications, operating procedures, manuals, regulations and other complex documents • consulting and negotiating with internal and external stakeholders • conducting life cycle analysis • analysing and problem solving, including root cause analysis • interpreting and manipulating data • drafting reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • sustainability impacts at different points in the value chain • principles of sustainable design • the sustainability hierarchy • sources and transport of materials and components and alternatives • processes for producing products, and alternatives • life cycle analysis techniques • hierarchy of hazard control and its application to sustainability hazards • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to determine the sustainability related benefits sought by customers for products and design a product to maximise the identified sustainability related benefits.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining customer benefit • identifying and ranking alternative ways of providing

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	that benefit • specifying preferred, sustainable alternative • communicating the above, as appropriate.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)

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Product	Product may include: • physical product • service • some other type of product A product will be something which is produced/developed for/provided to a customer or client
Benefit	Benefit includes, but is not limited to, consideration of the: • deliverable the customer expects • location in which it should occur • timing, duration, frequency and longevity of the deliverable • value to the customer • required maintenance and other 'running' inputs • disposal/replacement required by the customer • the degree to which the designed product is: • portable • modular • reusable • recyclable • returnable • easily able to be repaired after malfunction • durable • aesthetics • price
Alternative methods of delivering benefits	Alternative methods of delivering benefits may include: • selling a redesigned product • selling the benefit obtained from the product rather than the product • selling a combination of physical product and service rather than either • leasing (or similar) of the above • providing buy back/take back or similar • other alternative strategies Alternatives to be considered also include design for: • reuse • remanufacture • recycling
Portion of the value chain	Value chain is the sequence of activities that a firm

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	undertakes to create value/product (good or service). Portion of the value chain includes sections internal or external to the organisation
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as • state of the economy • stage of the business cycle
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

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Custom Content Section

Not applicable.

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MSS024001A Work and communicate effectively as an environmental technician

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the induction of an employee into an enterprise to undertake environmental technical work. It includes working within Australia's framework for environmental management and the culture of the enterprise, and the need to interact effectively with a large range of people in many industry and community settings.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise
- environmental compliance, auditing and inspection
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management, and site remediation
- management of contaminated sites
- geotechnical services and civil engineering
- natural resource management.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
1 Work within Australia's environmental management framework	1.1 Demonstrate broad knowledge of how governments, legislation, policies, codes of practice and Australian standards provide a framework of environmental protection measures in Australia
	1.2 Perform all work activities in accordance with relevant environmental management requirements, including sustainable energy principles and work practices
2 Work within enterprise structure and culture	2.1 Demonstrate broad knowledge of enterprise business goals, ethics, products and/or environmental services
	2.2 Identify key enterprise sites and/or functions and personnel
3 Work in accordance with enterprise agreements and legislative requirements	3.1 Locate key workplace information and apply it correctly
	3.2 Follow enterprise policy and procedures relating to employment, security, confidentiality and reporting lines
4 Provide environmental technical services	4.1 Identify workplace roles and responsibilities of personnel working within the environmental function
	4.2 Identify typical tasks and calendar of events in work area
	4.3 Recognise and locate the equipment and resources required

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		for everyday work
	4.4	Interpret work instructions correctly and seek clarification, if necessary
	4.5	Follow work instructions to perform environmental/technical tasks safely and efficiently
	4.6	Maintain own work area, equipment and materials in a safe and organised manner according to enterprise policy and procedures
	4.7	Recognise and locate the equipment and resources required for everyday work
	4.8	Interpret work instructions correctly and seek clarification, if necessary
	4.9	Follow work instructions to perform environmental/technical tasks safely and efficiently
	4.10	Maintain own work area, equipment and materials in a safe and organised manner according to enterprise policy and procedures
5 Organise daily work efficiently	5.1	Assess and prioritise workload according to level of responsibility
	5.2	Advise supervisor if additional resources or support are required to improve performance
	5.3	Undertake duties in a positive manner to enhance workplace cooperation and efficiency
6 Communicate/liaise effectively with customers, contractors and stakeholders	6.1	Listen actively and use appropriate language when communicating with other people
	6.2	Respond appropriately to verbal and written messages
	6.3	Record and convey information so that it is clearly understood

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	6.4	Respect the values, concerns and diverse views of people involved in, or impacted by, enterprise activities
	6.5	Resolve conflict through meaningful negotiation and compromise, where necessary
	6.6	Redirect inquiries or disputes beyond own area of responsibility to relevant personnel for action
	6.7	Adhere to site agreements and protocols in order to maintain credibility and trust
7 Accept responsibility for quality of own work	7.1	Monitor and adjust work practices to ensure that the quality of outputs is maintained
	7.2	Identify and report opportunities for improvements in procedures, processes and equipment in work area
8 Identify own learning needs	8.1	Identify career options and training opportunities in the enterprise
	8.2	Consult appropriate personnel to identify own learning needs for future work requirements and career aspirations

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using personal protective clothing, equipment and facilities as required
- following work instructions to complete tasks within the required timeframe
- working ethically
- working efficiently when alone and with others
- maintaining required quality of work outputs
- complying with legislative and enterprise requirements in everyday work
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

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Required knowledge includes:

- relevance of environmental legislation and codes of practice to the enterprise and own work
- enterprise business objectives, product and/or service range
- enterprise structure and reporting lines
- role of environmental function within the enterprise
- own role, rights, responsibilities and key tasks
- workplace procedures that govern personal work, health, safety and environment
- basic ethical values and principles, such as respect for the law, responsibility, courtesy, diligence and confidentiality
- use and names of equipment, materials and other resources relevant to work function
- relevant health, safety and environment requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • following workplace procedures to complete environmental/technical tasks within the required timeframe • efficiently organising own daily work • accepting responsibility for quality of own work.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024004A Process and present environmental data* • *MSL952001A Collect routine site samples.* The competencies covered by this unit would be

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	demonstrated by an individual working alone or as part of a team. Resources may include: • relevant documentation, such as enterprise procedures, legal/regulatory requirements and codes of practice • relevant equipment and materials • organisational charts and flow diagrams showing links between enterprise functions and/or production processes • employment, training and career information.
Method of assessment	The following assessment methods are suggested: • observation of candidate performing a range of environmental/technical tasks • feedback from peers and supervisors • oral or written questioning to check underpinning knowledge of Australia's environmental management framework and enterprise procedures • review of workplace documentation completed by the candidate. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with

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training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • international conventions, such as World Heritage Listing, RAMSAR Convention on Wetlands of International Significance • federal legislation, such as the Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and local government by-laws, policies, regulations and plans dealing with land use, cultural/heritage sites, vegetation management, biodiversity management, water management, pollution and contaminated sites • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • Australian Dangerous Goods Code ADG7 • Human Rights and Equal Opportunity Commission Act 1986 • occupational health and safety (OHS) national standards and codes of practice • enterprise environmental management plans and procedures for specific sites and/or activities (e.g. sampling, monitoring, construction and mining)
Business ethics	Business ethics may include: • following enterprise policy and procedures • behaving honestly and openly • respecting others and treating them with courtesy and impartiality • working diligently and responsibly • ensuring confidentiality of information, including client identification, data and results
Enterprise sites	Enterprise sites may include: • head office functions • supplier services and consultancy services • production or processing plants • survey/catchment/construction/mining sites

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	• laboratories
Key functions	Key functions may include: • consultancy services • policy • inspection/auditing and compliance • community liaison • production • packaging, warehouse and distribution • quality assurance • purchasing, sales and marketing • human resources (personnel, training and employee relations)
Sources of workplace information	Sources of workplace information may include: • noticeboards, public address or paging systems • standard operating procedures, manuals, work instructions, signs and notices • material safety data sheets (MSDS) • telephone or contract details, email systems and websites • emergency exits, routes and collection points • enterprise recording and reporting procedures, quality manuals, equipment and operating/technical manuals • sampling and test methods (validated and authorised) • schematics, workflows, site layouts and production and laboratory schedules
Enterprise agreements, policies and procedures	**Enterprise agreements, policies and procedures may include:** • industrial awards, enterprise bargaining agreements and individual contracts • emergencies, accidents and incidents • incident and accident/injury reports • health, safety and environment • quality assurance • customer services
Legislative requirements	**Legislative requirements may include:** • environmental protection • OHS • workers compensation • equal employment, anti-discrimination and anti-harassment

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	• ethics, copyright, intellectual property and privacy
Sustainable energy principles and work practices	**Sustainable energy principles and work practices may include:** • examining work practices that involve excessive use of electricity, gas and/or water • switching off equipment when not in use • regularly cleaning filters • recycling and reusing materials wherever feasible • minimising waste
Environmental technical services	**Environmental technical services may include:** • routine site sampling of water, air, soil and noise • packaging, labelling, storing and transporting samples • routine site measurements that involve a narrow range of variables and/or easily recognised acceptable ranges • straightforward field surveys • entering of data into enterprise databases, checking of data quality and reporting results • cleaning of equipment and/or vehicles • housekeeping of work areas
Equipment and resources	Equipment and resources will vary according to: • the scope and nature of the enterprise's environmental/technical functions and services, location and products
OHS and environmental management requirements	**OHS and environmental management requirements:** • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024002A Implement environmental management plans and procedures

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to apply environmental management plans and procedures to minimise the environmental impact of work activities and ensure legislative compliance. Personnel are required to identify environmental requirements in everyday work activities, issues and risks for projects and/or sites, recognise environmental incidents and apply the specified procedures or actions to control and minimise their impacts.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- groundwater, clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation
- resource efficiency (e.g. energy, water and waste auditing).
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Identify environmental management obligations	1.1	Identify legislative, regulatory and licensing requirements that apply to work activities
		1.2	Access the enterprise's environmental management plans that apply to specific sites and projects
		1.3	Confirm scope of responsibility for achieving environmental outcomes for specific sites and projects
		1.4	Confirm reporting requirements
2	Implement specified management plans and procedures	2.1	Review site history and environmental management issues, objectives and procedures that have been documented for specific sites and projects
		2.2	Plan work, incorporating appropriate control measures, to minimise identified risks and achieve specified environmental outcomes
		2.3	Undertake all work activities safely and in accordance with environmental requirements
3	Respond to potential/actual environmental issues and incidents	3.1	Recognise and assess environmental issues, risks, impacts and incidents arising during work activities
		3.2	Identify the triggers/response procedures for complaints, cultural heritage finds and other environmental incidents
		3.3	Apply established enterprise procedures for dealing with complaints, cultural/heritage finds and other environmental incidents

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		3.4	Record details of observations, assessments and any actions taken in accordance with enterprise procedures
		3.5	Notify specified personnel in accordance with enterprise procedures
4	Report the application of environmental plans and procedures	4.1	Monitor the effectiveness of environmental controls relating to work activities
		4.2	Complete environmental reporting requirements for specific sites and projects
		4.3	Maintain relevant environmental management documentation
		4.4	Identify and report opportunities for improving environmental procedures
		4.5	Contribute to regular reviews of environmental management plans and procedures

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements • applying environmental management plans and procedures when planning and conducting work activities • demonstrating attention to detail and due diligence • accurately observing and recording environmental conditions at sites • using enterprise checklists to assess environmental risks at local worksites • conveying information using clear and concise verbal/written communication • working both independently and in teams • solving straightforward problems • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge

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Required knowledge includes:

- terms, such as environmental protection, risk, hazard, control, impact, assessment and management
- concepts, such as conservation, cultural heritage and biodiversity
- relevant legislative/regulatory requirements and responsibilities
- environmental management plans/procedures and standard operating procedures relevant to job role
- site characteristics and environmental issues, risks and impacts
- specified control measures and management actions relevant to work activities
- enterprise procedures for identifying hazards/assessing risks associated with work activities
- enterprise procedures for responding to complaints, cultural/heritage finds and other environmental incidents
- enterprise environmental reporting requirements
- relevant health and safety requirements and enterprise safe work procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • assessing and explaining the environmental requirements relating to their work activities at sites • recognising and assessing hazards, risks, environmental issues and incidents relating to their work activities at sites using enterprise checklists • accurately recording and reporting details of hazards, risks, environmental issues and incidents • implementing specified environmental management plans, actions and procedures • contributing to continuous improvement of environmental procedures • completing relevant documentation clearly and accurately.
Context of and specific resources for	This unit of competency is to be assessed in the

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assessment	workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024000A and MSS025000A series of units* • *MSL environmental monitoring, sampling or testing series of units.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site history • relevant enterprise environmental management policies, plans, actions, procedures and checklists • physical resources required for work activities, such as maps, laptop computer, digital camera, and monitoring and sampling equipment.
Method of assessment	The following assessment methods are suggested: • feedback from peers and supervisors • oral or written questioning to check underpinning knowledge of environmental requirements for typical tasks • observation of candidate preparing for, and performing, a range of environmental/technical tasks • review of workplace documentation completed by the candidate. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Environment	The environment comprises the surroundings in which an enterprise and/or industry operates, and may include: • air, water and land • natural and built resources • flora and fauna • humans and how they interrelate
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • Australian Dangerous Goods Code ADG7 • occupational health and safety (OHS) national standards and codes of practice • enterprise environmental management plans and procedures for specific sites and/or activities (e.g. sampling, monitoring, manufacturing, construction and mining)

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Environmental management plans	Environmental management plans provide a framework for managing all environmental aspects, impacts, risks and obligations relevant to a site, project or significant work activity. Plans may include: • an aim, vision and enterprise policy statement • roles and responsibilities • potential environmental issues • actions to avoid, remedy and mitigate the issues • procedures and forms to minimise and manage specific environmental impacts and risks • quality management plans • communication and training requirements • monitoring, auditing and reporting requirements
Environmental issues	Environmental issues will vary with the scope and location of the enterprise's work activities, and may include: • emissions to air • releases to, and of, water • releases to land • soil erosion, sedimentation and salinity • contamination of land • disturbance of flora and fauna, threats to sensitive species and destruction of habitat • introduction of pests, such as weeds and fire ants • noise and vibration • disturbance to heritage sites or items • generation, reuse and disposal of waste • use of energy sources • handling, storage, spills, or exposure involving hazards, such as chemicals and radiation
Environmental risks and impacts	Environmental risks and impacts comprise any potential (actual) adverse or beneficial change to the environment, whether direct or inferred, wholly or partially resulting from an enterprise's activity, product or service. Risks and impacts may include: • mismanagement of chemicals or fuel products • mismanagement of biological agents • land use practices • planning deficiencies • poor construction processes • waste generation and disposal

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Sites	Sites may include: • buildings and other infrastructure • construction, mining, manufacturing, forestry, agricultural and maintenance sites • bushland • catchments, flood plains, surface/groundwater sites and drainage sites • wetlands and marine/coastal areas
Environmental reporting requirements	Environmental reporting requirements may include providing contributions to: • regular site environmental reports • non-conformance report forms • hazard, near miss and safety incident report forms • environmental incident investigation report forms • regulatory agency reports
Environmental management documentation	Environmental management documentation may include: • site/project history, plans, procedures, actions and checklists • information about applicable legislation and regulatory requirements • records of correspondence and complaints • incident reports and incident investigation reports • quality assurance/verification checklists • job hazard analyses, permits and safe work procedures • internal check/audit reports • training records • records to comply with permit, licence and approval conditions
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council

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	(NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024003A Apply an understanding of environmental principles to a site

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to 'read the landscape' in terms of the physical and biological components of the environment and the ecological linkages in operation at a site. Personnel are required to apply basic principles of geomorphology, hydrology and ecology in a systematic, scientific appraisal of site condition. This requires sufficient knowledge of chemistry, physics, geology and biology to support a scientific approach to field ecology.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- groundwater, clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management, and site remediation
- management of contaminated sites
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Prepare for site inspection	1.1	Obtain and use maps, photos and related documentation to gain a preliminary understanding of site features
		1.2	Collect site-specific or regional data on expected flora, fauna, soils and climate
		1.3	Review site history and previous environmental or ecological studies, if available
		1.4	Review all emergency plans, risk assessments, and safety and environmental management requirements associated with the field activities
		1.5	Review legislative and planning instruments applicable to current and future site usage
		1.6	Confirm site access requirements and identify potential site hazards
2	Conduct initial site survey	2.1	Sketch, map and/or photograph the site
		2.2	Observe and record the surface geology and geomorphology of the site
		2.3	Observe and record hydrology of the site
		2.4	Observe and record the major flora of the site
		2.5	Observe and record evidence of site fauna
		2.6	Observe and record infrastructure and other modifications to the site
		2.7	Consider the potential for presence of cultural and indigenous heritage items and record, as necessary
		2.8	Check for evidence of illegal or inappropriate activities

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3	Make an initial assessment of site condition	3.1	Use geomorphological and hydrological observations to describe surface condition and infer potential future impacts
		3.2	Make inferences on apparent ecological health of the site to plan for an initial ecological study of the site
		3.3	Determine the physical, chemical and biological parameters that would need to be measured and/or sampled during subsequent ecological appraisal of the site
4	Prepare for field study	4.1	Identify and describe the biological and chemical components of interest, sampling areas and field techniques to be used
		4.2	Identify, obtain and check required equipment and materials required for field study
		4.3	Securely stow all field equipment in vehicle to prevent damage in transit
		4.4	Safely transport all field equipment to site and prepare it for use
5	Perform a basic ecological field study of the site	5.1	Perform ecological sampling for abundance and diversity parameters using the general techniques of transects and quadrats
		5.2	Record appropriate descriptions of the habitat structure
		5.3	Perform sampling for simple population, demographic and age structure parameters
		5.4	Perform simple sampling and measurements on abiotic components
		5.5	Perform simple targeted species sampling
		5.6	Ensure compliance with relevant legislation, policy, codes of practice and accepted enterprise

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			procedures
6	Finalise field study	6.1	Ensure all samples and data are stored safely
		6.2	Rehabilitate sampling sites to render them safe and minimise environmental impacts
		6.3	Clean all equipment, containers, work area and vehicles according to enterprise procedures
		6.4	Pack and safely transport all samples, equipment and supplies back to home base
		6.5	Ensure dispatch of collected samples for subsequent analysis, as necessary
		6.6	Check serviceability of all equipment before storage
7	Process and present field data	7.1	Summarise field data using simple calculations, graphs, tables and/or maps
		7.2	Provide reports that include simple conclusions and interpretations based on raw or summarised data
8	Maintain a safe work environment	8.1	Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
		8.2	Minimise the generation of waste
		8.3	Ensure the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

Required skills
Required skills include:

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- site observational skills, including the ability to ‘step back’, question and interpret those observations
- researching and summarising existing data and reports
- communicating effectively
- planning and preparing for field activities
- field sampling and monitoring procedures, including labelling and traceability
- demonstrating correct and safe use of field instruments and/or equipment under laboratory and field conditions, including field calibration
- identifying and rectifying basic instrument faults
- writing/compiling concise and accurate reports
- responding effectively to changed or unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

Required knowledge includes:

- scientific terminology for environmental and ecological systems relevant to job role
- the structure of earth systems, including lithosphere, hydrosphere, atmosphere and biosphere (ecosphere)
- key concepts and principles of geomorphology, climate and hydrology
- fundamental concepts and principles in chemistry, physics, geology and biology to support a scientific approach to basic field ecology
- energy and material flows and cycles, including biogeochemical cycles
- the fundamentals of ecology, including:
- ecosphere, biome and major ecosystem types
- trophic structure of ecosystems, and hierarchies
- organism, population, community, ecosystem hierarchy; habitat and biodiversity
- abiotic and biotic components and their interrelationships and dependencies
- ecological systems and dynamics; stability, succession and disruption
- specific legislation, policies and codes of practice related to ecological field activities
- ecological, chemical and physical field monitoring procedures relevant to job role
- procedures for maintaining, storing and transporting samples/specimens to ensure their wellbeing, viability and integrity
- relevant health, safety and environment requirements, including field safety/survival principles

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • applying relevant aspects of environmental legislative and planning framework to site appraisal • researching, reviewing and summarising site environmental history • identifying key aspects of emergency, safety or environmental management plans that relate to a defined field activity • applying a working knowledge of relevant terminology, concepts and principles in geology, geomorphology, hydrology and ecology to provide a scientific, systematic appraisal of site environmental condition • planning and performing an ecological study and obtaining relevant, reliable data • demonstrating correct use of field instruments and/or equipment under laboratory and field conditions, including field calibration • applying sampling, testing and data quality procedures to accurately perform field tests • recording and reporting appraisal of site condition • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL974007A Undertake environmental field-based monitoring* • **field-based environmental monitoring units, such as:** *MSS024009A Assist with assessing and monitoring stormwater systems* **or** *MSS025013A Assist with assessing and monitoring wetlands* • *MSS024004A Process and present environmental*

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	data. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • access to suitable sites and a vehicle • vehicles, survey equipment, sampling/monitoring equipment, cameras, consumables and manuals • work program, enterprise procedures, codes of practice and field protocols • information, such as maps and flora/fauna keys.
Method of assessment	The following assessment methods are suggested: • review of data, results and site reports prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, survey, sampling/measurement methods, and works safely • oral/written questioning associated with appraisal of environmental site condition • observation of the candidate conducting site appraisals • review of records completed by the candidate. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation, wildlife/plant protection, prevention of cruelty to animals and quarantine • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • codes of practice dealing with the care and use of animals for scientific purposes • national environment protection measures • government policy (e.g. sustainable development and impact assessment) • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental management basic set • AS/NZS 2031:2001 Selection of containers and preservation of water samples for microbiological analysis • AS 1726:1993 Geotechnical site investigations • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice

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	• site-specific requirements • specific environmental standards
Ecological principles and concepts	Ecological principles and concepts may include: • ecosphere, biome and major ecosystem types • ecological niche and biogeography • trophic dynamics, autotrophs, heterotrophs and detrivores, and food webs • distribution and abundance of organisms, populations and communities, and biodiversity • abiotic and biotic components and their interrelationships and dependencies • energy and material flows and cycles, including biogeochemical cycles • population ecology: • distribution, abundance and dispersion • growth rates and age structures • migration and dispersal in space and time • behavioural ecology (communication and learning, aggression and territoriality, and social group dynamics) • community ecology (ecological interactions): • intra/interspecific competition • concepts of coexistence, adaptive and competitive, including mimicry, coevolution, parasitism, mutualism, commensalism and predator/prey systems • species diversity in time and space
Earth science principles and concepts	Earth science principles and concepts may include: • geology: • earth structure and plate tectonics • classification of rocks (e.g. igneous, sedimentary, volcanic and stratigraphy) • weathering • geomorphology: • erosion and mass wasting • transportation and deposition, and sedimentation • fluvial, aeolian, hillslope and weathering processes • soil science: • soil classification • soil formation and soil profiles • pedology • edapology

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Hydrolgical principles and concepts	**Hydrolgical principles and concepts** may include: • the hydrologic cycle: • run-off • infiltration • subsurface flow • water quality • ecohydrology • hydrogeology • water resources • hydrologic measurement: • surface flows (stream gauging) • groundwater (infiltration and flow) • precipitation and evaporation
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Equipment	Equipment may include: • navigation and communication equipment (e.g. compass, maps, global positioning system (GPS), two-way radio and mobile phone) • survey equipment • sampling equipment and containers, and animal cages • parameter specific meter or multi-probes (e.g. dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature) • field test kits to determine such parameters as dissolved gases, chemical anions and cations, heavy metals, E. coli and biological oxygen demand (BOD) • portable colourimeters and field microscopes • filters and sieves • soil monitoring kits • data loggers • first aid equipment

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Field monitoring activities and skills	Field monitoring activities and skills may include: • sample collection, preservation, labelling, storage, and transportation according to enterprise procedures • correct use and calibration of field instruments according to written instructions • correct and accurate performance of field tests for specific parameters • clear and accurate recording of data • safe operation of motor vehicles and boats
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects • vehicle and boat handling in rough/remote conditions
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024004A Process and present environmental data

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to retrieve environmental data; evaluate formulae and perform scientific calculations; present and interpret information in tables, graphs and simple maps; and keep accurate records. The unit requires personnel to solve problems of limited complexity where the information may be not obvious, but not contradictory, and can be determined by direct reasoning.

Application of the Unit

This unit of competency is applicable to environmental technicians working in all industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Retrieve and check environmental data	1.1	Store and retrieve data using appropriate files and/or application software
		1.2	Verify the quality of data using enterprise procedures

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		1.3	Rectify errors in data using enterprise procedures
2	Calculate scientific quantities	2.1	Calculate statistical values for given data
		2.2	Calculate scientific quantities using given formulae and data and estimate uncertainties
		2.3	Ensure calculated quantities are consistent with estimations and expectations
		2.4	Report all calculated quantities using the appropriate units and correct number of significant figures
3	Present data	3.1	Present data in clearly labelled tables, charts and/or simple maps
		3.2	Graph data using appropriate scales to span the range of data or display trends
		3.3	Report all data using the appropriate units and number of significant figures
4	Interpret data variations and trends	4.1	Compare data with reference values or expected ranges
		4.2	Recognise and report significant variations and trends in data
		4.3	Interpret significant features of graphs, such as gradients, intercepts, maximum and minimum values, and limit lines
5	Keep accurate records and maintain confidentiality	5.1	Transcribe information accurately
		5.2	Verify the accuracy of records following enterprise procedures
		5.3	File and store workplace records in accordance with enterprise procedures
		5.4	File all reference documents logically and keep

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them up-to-date and secured

5.5 Observe enterprise confidentiality standards

Required Skills and Knowledge

Required skills
Required skills include: • performing calculations of scientific quantities • using scientific notation • applying the concepts of metrology • applying calculations to the workplace • coding, recording and checking data accurately • presenting accurate results in the required format • preparing graphs, tables and charts (e.g. pie, bar and histogram), and/or simple maps • comparing data with reference values and interpreting variations and trends in data (e.g. seasonal, diurnal, location and non-conformance) • maintaining the confidentiality of data in accordance with enterprise and regulatory requirements • seeking advice when issues/problems are beyond scope of competence/responsibility
Required knowledge
Required knowledge includes: • concepts of metrology • the international system of units (SI) • relevant scientific and technical terminology • uncertainty associated with measurement steps • procedures for coding, entering, storing, retrieving and communicating data • procedures for verifying data and rectifying mistakes • converting units involving multiples and submultiples • significant figures, rounding off, estimating and approximating • transposing and evaluating formulae • calculations involving fractions, decimals, proportions and percentages • determining statistical values of data, such as mean, median, mode and standard deviation • procedures for maintaining and filing records, and maintaining security of data

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • coding, recording and checking the documentation of data • calculating statistical quantities relevant to the workplace and presenting accurate results in the required format • recognising anomalies, variations and trends in data • maintaining the confidentiality of data in accordance with workplace and regulatory requirements • keeping records up-to-date and secure.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL924002A Use laboratory application software* • **environmental monitoring units, such as:** • *MSL974007A Undertake environmental field-based monitoring* • *MSS024003A Apply an understanding of environmental principles to a site* • *MSS024006A Perform sampling and testing of water*. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • data sets and records • computer and relevant software or laboratory information system • relevant workplace procedures.

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Method of assessment	The following assessment methods are suggested: • review of data worksheets, calculations, computer files (such as spreadsheets, databases and statistical analysis), graphs, tables, charts and/or simple maps prepared by the candidate • review of records transcribed, maintained or stored by the candidate • questions to assess understanding of relevant procedures and trends in data • feedback from supervisors and peers about the candidate's ability to consistently follow enterprise procedures • observation of the candidate as they process data, file and store records. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, codes, procedures and/or enterprise requirements	**Standards, codes, procedures and/or enterprise requirements may include:** • Australian and international standards such as: • AS ISO 1000-1998 The international system of units (SI) and its application • ISO 5725 Accuracy (trueness and precision) of

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	measurement methods and results • ISO/IEC Guide 98-3:2008 Uncertainty of measurement - Part 3: Guide to the expression of uncertainty in measurement (GUM) • sampling/testing methods, procedures, guidelines provided by enterprise or regulator • material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks • enterprise quality manual and customer quality plan • validation of the equipment and associated software, where applicable • validation of spreadsheets developed in-house for routine calculations
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Environmental data	**Data may be recorded on:** • worksheets • spreadsheets • databases linked to information management systems **Data may include results of:** • observations • field tests and measurements • population surveys (type, species, age, sex and weight) • vegetation surveys (type, species, height, density and canopy) • dilution of working solutions and gases (odours) • laboratory analyses • quality assurance and control assessments **Data may be presented in the form of:** • graphs

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	• tables • histograms • pie charts • bar charts • semi-quantitative observations and be expressed on a scale (e.g. 1 to 4 or + to ++++) • photographs
Calculations	Calculations may be performed: • with or without a calculator • using computer software, spreadsheets, databases and statistical packages
Calculations of scientific quantities	**Calculations of scientific quantities may include:** • converting units involving multiples and submultiples • significant figures, round off, estimate and approximate • transposing and evaluating formulae • fractions, decimals, proportions and percentages • percentage and absolute uncertainties in measurements and test results • statistical values of data, such as mean, median, mode and standard deviation • perimeters and angles, areas (m^2) and volumes (mL, L, m^3) of regular shapes • sampling times • dose (mg), average mass, mass percentage, density, specific gravity, moisture, relative and absolute humidity, viscosity and permeability • ratios, such as mass to mass, mass to volume and volume to volume percentages • concentration, such as molarity, g/100mL, mg/L, mg/µL, ppm, ppb, dilution mL/L • average count, colonies per swab surface and cell counts, such as live and dead/total • variables, such as pressure, gauge pressure, velocity and flow rates • biological oxygen demand (BOD), chemical oxygen demand (COD) and total organic carbons (TOC) • % content of moisture, sulphur dioxide and trace metals, such as calcium or zinc
Records	Records could include information associated with: • purchase of equipment and materials

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	• service records • safety procedures • history of calibration and test results
Occupational health and safety (OHS) and environmental management requirements	**OHS and environmental management requirements:** • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024005A Collect spatial and discrete environmental data

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to obtain and store spatial and discrete environmental data using handheld global positioning system (GPS) equipment.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene outdoor monitoring (e.g. air, noise and radiation)
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- site remediation and rehabilitation
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Prepare for data collection	1.1	Locate and review relevant legislative/regulatory, enterprise requirements and background information for site/project
		1.2	Locate and interpret specifications for spatial and environmental data collection
		1.3	Develop a data collection plan in accordance with specifications and relevant requirements
		1.4	Establish codes for environmental attributes
		1.5	Assemble equipment and check that it is fit for purpose
		1.6	Confirm plan with supervisor, as necessary
2	Safely collect GPS and environmental data	2.1	Set up environmental measuring instruments on site and perform pre-use/calibration checks
		2.2	Set up GPS equipment with correct datum and projection settings
		2.3	Operate instruments/equipment in accordance with manufacturer specifications and enterprise procedures
		2.4	Determine conditions for obtaining optimum GPS positions
		2.5	Collect point positional data in accordance with data collection plan
		2.6	Attribute environmental data for each location
		2.7	‘Ground truth’ GPS data using maps, aerial photos and/or satellite imagery
		2.8	Verify environmental data, identify atypical results and review procedures/troubleshoot equipment, as necessary

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3	Report data and finalise documentation	3.1	Use appropriate GPS software to download and process GPS and environmental data and extract required information
		3.2	Use specified quality tests and enterprise procedures to check acceptability of environmental data
		3.3	Report location and environmental data using required formats and within the expected timeframe
		3.4	Complete all required documentation
		3.5	Maintain the security and confidentiality of data and documentation in accordance with enterprise requirements

Required Skills and Knowledge

Required skills
Required skills include: • reading and interpreting instructions, specifications, procedures and manuals • planning and organising resources for data collection • reading and interpreting maps and aerial photos • using computer equipment to collect, manipulate and file spatial/environmental data • using basic troubleshooting and problem-solving methods to check/address atypical data • performing calculations involving height, depth, dimensions, uncertainty, accuracy and precision • relating direction and position on ground to visual representations • presenting results and preparing technical reports • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • legislative requirements, standard methods and enterprise procedures governing data collection • environmental terms, concepts and principles relevant to data collection • operating principles of GPS equipment and environmental instruments, set-up and

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optimisation methods, and equipment limitations • uncertainty, accuracy and precision of measurements, and data requirements • data formats • methods for data processing, manipulation and management • relevant health and safety requirements and enterprise safe work procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • planning and conducting data collection efficiently and safely • setting up and operating handheld GPS equipment and environmental instruments correctly • collecting spatial and environmental data that meet specifications • recognising and recording atypical data • conducting basic troubleshooting of equipment • processing, presenting and storing data reliably • completing required documentation accurately.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • **environmental monitoring units, such as:** • *MSL974007A Undertake environmental field-based monitoring* • *MSS024008A Recognise common geological landforms and samples* • *MSS024011A Navigate in urban, regional and remote areas.*

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	The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • GPS receivers and related GPS software • environmental monitoring instruments, digital camera and sampling equipment • site/project history, maps and aerial photos • guidelines, codes, regulations and enterprise procedures governing data collection.
Method of assessment	The following assessment methods are suggested: • review of data and results obtained by the candidate • feedback from supervisors and peers • observation of candidate collecting data with a focus on: • general site reconnaissance and observations • set-up and use of equipment • accurate data recording • problem solving/troubleshooting • safe work practices • oral and/or written questions to assess understanding of enterprise procedures, use of equipment and interpretation of data. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water, water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • enterprise or regulator procedures for sampling, monitoring and in-field testing • equipment manuals and standard operating procedures • material safety data sheets (MSDS) • safe work procedures
Background information	Background information may include: • site or project history • client history • records of consultations with stakeholders • emergency plans and safety procedures • site access protocols and permits • site utilities/services (e.g. water, sewer, electricity and gas) • maps (e.g. road, topographical and survey marks)

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	• existing data sets (e.g. vegetation, topography, soils and regional ecosystem maps) • hazards and safety risks
Specifications	Specifications may include: • purpose of data collection • detailed descriptions of spatial and environmental data requirements: • positional data, metadata, calculated information • environmental measurements • sampling • data processing requirements • data quality requirements • data presentation/reporting requirements
Equipment	Equipment may include: • any handheld GPS receiver • sampling and environmental monitoring equipment • communications equipment (e.g. radio and phone) • safety equipment
Project parameters	Project parameters may include: • coordinate systems • datum • display formats • information displays • data outputs, formats and protocols
Verifying data	Verifying data may include checking the quality of environmental data by: • comparison with expected or reference values • conducting repeat tests, and using duplicate samples or locations
Required documentation	Required documentation may include: • map of GPS data locations • sampling, monitoring or in-field test data and results • records of vehicle/equipment use • records of time spent and approved expenditure • emails and correspondence • records of site consultations • final report/briefing
Occupational health and safety (OHS) and environmental	OHS and environmental management requirements: • all operations must comply with enterprise OHS and

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management requirements	environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024006A Perform sampling and testing of water

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to sample natural, polluted and process water for both chemical and microbiological parameters and perform field measurements.

Note that this unit does not cover the sampling and field testing of groundwater, which is addressed in MSS025006A Collect and evaluate groundwater data. Nor does it cover laboratory analysis of water which is addressed in MSL974003A Perform chemical tests and procedures and MSS025012A Perform environmental microbiological tests.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services
- environmental compliance, auditing and inspection
- clean water (catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management, and site remediation
- management of contaminated sites
- geotechnical services and civil engineering
- natural resource management
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm sampling and testing requirements	1.1	Confirm the sampling location, number and type of samples, and timing and frequency of sampling from the enterprise or client's sampling plan
		1.2	Check that all sampling and testing procedures are in accordance with client or enterprise requirements, relevant standards and codes
2	Prepare for water sampling	2.1	Identify site and sampling hazards and review enterprise safety procedures
		2.2	Liaise with relevant personnel to arrange site access and, if appropriate, all necessary clearances and/or permits
		2.3	Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit
		2.4	Ensure all reagents, solutions, standards and blanks (as appropriate) are obtained and/or prepared ready for field use
		2.5	Select field test equipment/instruments and check operation and calibration, as required, in accordance with procedures and manufacturer instructions
		2.6	Assemble and check all sampling equipment, field test equipment, materials, containers and safety equipment
		2.7	Arrange suitable transport to, from and/or around site as required
3	Conduct sampling of water	3.1	Locate sampling sites and, if required, services at the site

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		3.2	Conduct representative sampling in accordance with sampling plan and defined procedures for field and/or laboratory testing, as required
		3.3	Ensure all controls, blanks and replicate samples are properly integrated into the sampling process
		3.4	Record all information and label samples in accordance with traceability requirements
		3.5	Record environmental conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity
		3.6	Transport all samples back to base according to enterprise procedures and relevant codes
		3.7	Distribute samples/sub-samples to required destinations for testing, maintaining sample integrity, traceability and chain of custody requirements, as necessary
4	Conduct field testing of water	4.1	Obtain sample or sub-sample for designated field test, or locate testing location for in-situ testing
		4.2	Check equipment/instruments set-up and reagents and calibrate, as necessary, to ensure safe operation and valid results
		4.3	Run quality control (QC) samples to check method validity
		4.4	Operate equipment/instruments in accordance with test method requirements
		4.5	Perform tests/procedures/observations on all samples, and standards, if appropriate, in accordance with specified methods
		4.6	Record all field observations and results and ensure that they are accurately transferred to enterprise information database
5	Maintain a safe	5.1	Use defined safe work practices and personal protective equipment to ensure personal safety

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work environment	and that of others
5.2	Minimise the generation of waste
5.3	Rehabilitate sampling site to render it safe and minimise environmental impacts
5.4	Clean all equipment, containers, work area and vehicles according to enterprise procedures
5.5	Check serviceability of all equipment before storage
5.6	Ensure the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

Required skills
Required skills include: • planning and preparing for field activities • site observational and descriptive skills • researching and summarising existing data and reports • communicating effectively and writing/compiling concise and accurate reports • field sampling and monitoring procedures, including pre-treatment, containers, preservation, storage, labelling and traceability • demonstrating correct and safe use, of field instruments and/or equipment under laboratory and field conditions, including field calibration • identifying and rectifying basic instrument faults • collecting representative samples in accordance with a sampling plan • using appropriate techniques to preserve the integrity of samples • identifying atypical materials and samples and taking appropriate action • maintaining sampling equipment • completing sampling records • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others • following requirements for the disposal of waste and the preservation of the environment
Required knowledge

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Required knowledge includes:

- appropriate scientific terminology for water chemistry, biology and microbiology
- the hydrologic cycle
- fundamentals of aquatic chemistry, including:
- physical and chemical properties of water
- chemical equilibria in natural, polluted and process waters
- biogeochemical processes in freshwater and marine systems
- water analytical environmental chemistry
- environmental contaminants in water (fate, transport and bioaccumulation)
- fundamentals of hydrobiology, including:
- aquatic and benthic flora and fauna
- aquatic microorganisms
- marine, estuarine and freshwater ecosystems
- stratification and eutrophication in water bodies
- aquatic microbiology
- principles of representative sampling
- principles and procedures for random, systematic and stratified sampling, including consistency of sampling procedures
- preservation of the integrity of samples
- maintaining identification of samples relative to their source
- enterprise and/or legal traceability requirements
- cost-effectiveness of sampling
- common characteristics of water to be sampled and likely contaminants
- links between quality control, quality assurance, quality management systems and sampling procedures
- enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods
- links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence

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	include: • planning and preparing for sample collection • interpreting and correctly applying sampling, testing and data quality procedures • demonstrating correct and safe use of field instruments and/or equipment, including field calibration • obtaining reliable, representative water samples • obtaining valid and reliable field test data • preparing calibration graphs and calculating results using appropriate units and precision • identifying atypical results as out-of-normal range or an artefact • completing sampling records using enterprise procedures • working safely and follow relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024003A Apply an understanding of environmental principles to site issues* • *MSL974003A Perform chemical tests and procedures* • *MSL974007A Undertake environmental field-based monitoring.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • vehicles, survey equipment, water sampling and monitoring equipment, cameras, consumables and manuals • work program, enterprise procedures, codes of practice, maps and field protocols.
Method of assessment	The following assessment methods are suggested: • inspection of water samples collected by the candidate • review of water sampling and testing records

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	completed by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, sampling/testing procedures and works safely • oral and written questioning to check underpinning knowledge of water sampling and testing procedures, use of equipment and normal ranges • review of other workplace documentation completed by the candidate. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection

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	• environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental management basic set • AS/NZS 2031:2001 Selection of containers and preservation of water samples for microbiological analysis • AS 3550 series - Water analysis • AS/NZS 4276 series - Water microbiology • AS/NZS 5667 series - Water quality: sampling • US Environmental Protection Authority (EPA) Methods and guidance for the analysis of water • American Public Health Association (APHA) Standard methods for the examination of waters and wastewaters • ANZECC Guidelines for fresh and marine water quality • Australian guidelines for water quality monitoring and reporting • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. sustainable development and impact assessment) • occupational health and safety (OHS) national standards and codes of practice • material safety data sheets (MSDS) • site-specific requirements • specific environmental standards
Common field test parameters	Common field test parameters may include: • pH • electrical conductivity • dissolved oxygen • salinity

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	• temperature • turbidity • Secchi disk depth
Laboratory test parameters	Laboratory test parameters (many of which may also be measured in the field) may include: • total suspended solids • volatile suspended solids • nitrogen (nitrate, organic, ammonia and Kjeldahl) • phosphorus (total and soluble reactive) • chlorophyll and phaeophytin • total organic carbon (TOC) • biological oxygen demand (BOD) • chemical oxygen demand (COD) • silica • metals (total and dissolved) • organic and inorganic pollutants • microorganisms
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • use of field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Equipment	Equipment may include: • navigation and communication equipment (e.g. compass, maps, global positioning system (GPS), two-way radio and mobile phone) • survey equipment • sampling equipment and containers, and animal cages • parameter specific meter or multi-probes (e.g. dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature) • field test kits to determine such parameters as dissolved gases, chemical anions and cations, heavy metals, E. coli and BOD • portable colorimeters and field microscopes

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	• filters and sieves • soil monitoring kits • data loggers • first aid equipment
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects • vehicle and boat handling in rough/remote conditions
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024007A Collect and evaluate meteorological data

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to site and set up basic 'ground level' meteorological equipment and collect and record reliable data. It also includes the ability to assess data quality, interpret significant data features and use the data to ensure the validity of air and noise monitoring measurements.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- solid and hazardous waste management, and site remediation
- management of contaminated sites
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Prepare for field work	1.1	Review job request to identify the equipment required and the appropriate meteorological parameters to be measured
		1.2	Identify hazards and enterprise safe work procedures associated with the site, test methods and equipment used
		1.3	Confirm site location, access, timing and any client requirements
		1.4	Assemble all required equipment/materials and check that they are fit for purpose
		1.5	Stow equipment/materials to ensure their safe transport, as necessary
		1.6	Arrange transport to site, as necessary
		1.7	Liaise with appropriate personnel on arrival at site to ensure safety and minimise disruption to others, as necessary
2	Perform basic meteorological measurements	2.1	Select an appropriate location for the meteorological equipment at the site to ensure valid readings for the required parameters are achievable
		2.2	Install and check instrumentation and any recording/data logging equipment to ensure it is functioning correctly
		2.3	Confirm calibration status of meteorological equipment
		2.4	Perform measurements using ‘ground level’ meteorological equipment
		2.5	Collect meteorological data using physical or electronic methods
		2.6	Ensure wind direction sensors are aligned or corrected to true north rather than magnetic north

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3	Verify meteorological data	3.1	Ensure that quality requirements for data are met
		3.2	Perform any required corrections, calculations and data manipulations and identify significant trends in data
		3.3	Check for anomalous data and take appropriate corrective action
		3.4	Verify that processed data meets requirements
4	Interpret and apply meteorological information	4.1	Relate meteorological data to weather maps and other sources of meteorological data
		4.2	Associate meteorological conditions with related weather maps
		4.3	Compare weather patterns and data for different time periods and geographic locations
		4.4	Interpret meteorological data in terms of local atmospheric conditions
		4.5	Use meteorological data to interpret and/or assist with processing air and/or noise monitoring data
5	Maintain a safe work environment	5.1	Use safe work procedures and protective equipment to ensure personal safety and that of others
		5.2	Minimise environmental impacts of meteorological measurements and generation of waste
		5.3	Collect and/or dispose of all waste in accordance with environmental/quarantine requirements and enterprise procedures
6	Report data and finalise documentation	6.1	Report field data in the required formats and expected timeframe
		6.2	Complete all required documentation
		6.3	Maintain the security and confidentiality of data

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and documentation in accordance with enterprise requirements

Required Skills and Knowledge

Required skills
Required skills include: • planning and organising resources for field work • following legislative requirements, standard methods, enterprise procedures and instructions governing meteorological measurement • reading maps and aerial photos • collecting, collating and recording simple meteorological information for a site • applying meteorological data to results from other environmental monitoring programs • using and maintaining equipment to obtain reliable measurements for required parameters • identifying and rectifying basic instrument faults • preparing brief oral/written reports • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • distinction between weather and climate and an awareness of climate change science • composition and structure of the atmosphere, especially the lower atmosphere • solar energy spectrum and link to atmospheric conditions • seasonality, effects of latitude and continental geography • atmospheric motion (horizontal and vertical) • lifting (orographic, convective and frontal) • basic pressure/temperature/volume principles • high and low pressure cell formation • weather effects (e.g. precipitation, temperature and wind strength/direction) and interpretation of maps • local wind effects (e.g. sea breeze, city breeze, katabatic winds and anabatic winds) • forms of atmospheric moisture and humidity • atmospheric conditions related to wind direction • measurement of atmospheric conditions (e.g. precipitation, temperature, humidity, wind speed and direction) • weather maps (e.g. symbols used, terminology, interpretation and forecasts)

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- historical and geographic comparison of weather data
- operation, calibration and maintenance of meteorological equipment
- scalar and vector wind speed and direction calculations
- wind run
- influence of different sampling intervals and averaging times

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • explaining the purpose and objectives of the meteorological monitoring, including: • information and analysis required • end users of information • significance of outcomes for broader programs • planning and preparing for field work • interpreting and applying relevant enterprise procedures and standard methods • setting up, checking and operating meteorological equipment to obtain sufficient measurements to ensure reliable data • accurately recording field data • assessing data quality and interpreting significant features and anomalies • using data to ensure validity of air and noise monitoring programs • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024003A Apply an understanding of*

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	environmental principles to a site • *MSS025000A series units associated with the monitoring of air, odour and noise* • *MSL974009A Undertake field-based remote-sensing monitoring.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • access to suitable sites and vehicle • enterprise procedures governing siting and operation of meteorological measurements • maps and aerial photos • suitable meteorological measuring equipment.
Method of assessment	The following assessment methods are suggested: • review of meteorological data, results and measurement records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures and works safely • oral/written questioning associated with basic meteorology and in-field measurement of meteorological parameters • observation of work carried out in the field with a focus on: • identification of monitoring site according to defined criteria • safe, reliable set-up and operation of equipment • recording, storing, analysing and presenting basic meteorological data. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.

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Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS 2923:1987 Ambient air - Guide for measurement of horizontal wind for air quality applications • Australian Bureau of Meteorology Observation Specification 2013.1 Guidelines for the siting and exposure of meteorological instruments and observing facilities • National Environment Protection (Ambient Air Quality) Measure Technical Paper No 6: Meteorological Measurements • World Meteorological Organisation - No. 8: Guide to meteorological instruments and methods of

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	observation • enterprise or regulator procedures for sampling and in-field testing • material safety data sheets (MSDS) • safe work procedures
Hazards may include	**Hazards may include:** • sunlight, dust, noise and heat • extreme weather conditions (e.g. fire, flood and storms) • manual/handling of heavy equipment or materials • crushing, entanglement and cuts associated with moving machinery • vehicular traffic on roads and sites • injuries caused by falling objects and working conditions, such as uneven surfaces, heights, slopes and wet surfaces • biohazards (e.g. microbiological organisms in soils) • chemical hazards/contaminants in soils
Siting and installation considerations for meteorological instrumentation	**Siting and installation considerations for meteorological instrumentation** may include: • topography • vegetation and built structures • exposure • availability of services • site security
Meteorological instrumentation	**Meteorological instrumentation** may include: • thermometers: • liquid in glass • thermocouples • Pt resistance • thermistors • hygrometers and psychrometers • barometers: • aneroid • mercury • anemometers: • rotational • pressure tube • Doppler • rain gauges: • manual

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	• tipping bucket • automatic weather stations (AWS) • radiometers • net pyranometer • total solar radiometer
Meteorological parameters	**Meteorological parameters** may include: • temperature and temperature gradient • atmospheric pressure • humidity • precipitation • wind speed and direction (vector and scalar) • vertical wind speed • insolation and net radiation • evaporation
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024008A Recognise common geological landforms and samples

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to recognise common geological landforms and relate these to basic geological processes and other ecosystem components. Personnel are also expected to obtain (near) surface samples of common rocks, minerals and soils and identify them using classification tables and charts.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- solid and hazardous waste management
- management of contaminated sites
- site remediation or rehabilitation
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Prepare for field work	1.1	Review job request to identify the equipment involved, samples to be collected and/or test methods
		1.2	Identify hazards and enterprise safe work procedures associated with the site, samples, test methods and equipment used
		1.3	Confirm site location, access, timing and any client requirements
		1.4	Assemble all required equipment/materials and check that they are fit for purpose
		1.5	Stow equipment/materials to ensure their safe transport, as necessary
		1.6	Arrange transport to site, as necessary
		1.7	Liaise with appropriate personnel on arrival at site to ensure safety and minimise disruption to others, as necessary
2	Recognise geological structures and processes	2.1	Recognise common landforms and relate these to geological processes
		2.2	Interpret simple geological maps, diagrams and aerial photos
		2.3	Apply principles of geological processes and the geological timescale to explain the formation and occurrence of common rocks, minerals, soils and aquifers
3	Identify common rocks and minerals	3.1	Sort handheld specimens of common sedimentary, igneous and metamorphic rocks by observing their textural, structural and mineralogical properties

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		3.2	Identify handheld specimens of common rocks and minerals by comparing their physical properties with classification charts and tables
4	Identify common soil types and their properties	4.1	Obtain soil samples using specified sampling equipment and methods Examine soil colour, texture and properties of soil components to classify common soils
		4.2	Identify and describe simple soil profiles at field sites
		4.3	Recognise influences of rock type, drainage, age and climate on development of soil profiles
		4.4	Recognise common forms of soil degradation
5	Relate local geology to flora and fauna and land use	5.1	Apply the basic relationships between parent material, climate, topography, soils and living ecosystem components to interpret sites
		5.2	Recognise how local geology can influence the revegetation or rehabilitation of sites
6	Maintain a safe work environment	6.1	Use safe work procedures and protective equipment to ensure personal safety and that of others
		6.2	Minimise environmental impacts of sampling/testing and generation of waste
		6.3	Collect and/or dispose of all waste in accordance with environmental/quarantine requirements and enterprise procedures
7	Report data and finalise documentation	7.1	Report field data in the required formats and expected timeframe
		7.2	Complete all required documentation
		7.3	Maintain the security and confidentiality of data

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and documentation in accordance with enterprise requirements

Required Skills and Knowledge

Required skills
Required skills include: • planning and organising resources for field work • following legislative requirements, standard methods, enterprise procedures and instructions governing geological sampling and in-field testing • reading topographical maps and aerial photos, and simple geological maps • collecting, collating and recording simple geological information for a site • using and maintaining equipment to undertake required field work • preparing brief oral/written reports • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • overview of major fields of geology • basic structure of the earth, including the core, crust and major components • basic geomorphology and landforms, including agents of erosion and transportation, stability of rocks and minerals in different environments, and depositional processes • regolith, including physical and chemical weathering, climactic effects, stability of minerals, weathering processes, soil formation, common soil types and composition • rock cycle • introduction to igneous rocks, including origin of magma, movement of magma, volcanic, plutonic, types of volcanoes and simple tectonic setting • introduction to sedimentary rocks, including clastic, chemical, organic types, grain size and composition, sorting, roundness, lithification, sedimentary structures and environments of deposition • introduction to metamorphic rocks, including regional, contact, dynamic metamorphic zones, rock textures and fabrics • structural geology concepts, including folds, faults, tilts and uplifts • overview of geological time, including eras, periods, relative time, stratigraphic methods for establishing relative ages of strata, and radiometric dating • introduction to palaeontology, including preservation of fossils and their role in dating strata • introduction to the links between local geology, climate, topography and living components

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of ecosystems • geological sampling and in-field test methods routinely used in job role, including: • pre-use checks and safe operating procedures for sampling/test equipment • sampling procedures • purpose, principles and measurement steps of test • calculation steps to give results in appropriate units and precision • expected values for sample type

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • planning and preparing for field work • following relevant procedures and methods for conducting field surveys • recognising common geological landforms and explaining their formation • identifying handheld specimens of common rocks and minerals • obtaining and classifying samples of common soils • relating local geology to other ecosystem components • accurately recording field data • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL952001A Collect routine site samples* • *MSS024003A Apply an understanding of environmental principles to a site* • *MSS024005A Collect spatial and discrete*

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	environmental data. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • access to suitable sites and vehicle • enterprise procedures governing geological sampling and in-field testing • maps and aerial photos • suitable survey, sampling and testing equipment.
Method of assessment	The following assessment methods are suggested: • review of field data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures and works safely • oral/written questioning associated with basic sampling and in-field testing of common rocks, mineral and soils and their identification, and 'reading the landscape' • observation of the candidate undertaking basic geological field work. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice,

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	and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS 1289 series Methods of testing soils for engineering purposes - Sampling and preparation of soils • enterprise or regulator procedures for sampling and in-field testing • material safety data sheets (MSDS) • safe work procedures
Hazards	Hazards may include: • sunlight, dust, noise and heat • extreme weather conditions (e.g. fire, flood and storms) • manual/handling of heavy equipment or materials • crushing, entanglement and cuts associated with moving machinery • vehicular traffic on roads and sites • injuries caused by falling objects and working conditions, such as uneven surfaces, heights, slopes, wet surfaces, trenches and confined spaces

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	• biohazards (e.g. microbiological organisms in soils) • chemical hazards/contaminants in soils
Equipment and materials	Equipment and materials may include: • survey equipment, compass, global positioning system (GPS), maps and aerial photos • tape measure, clinometers and theodolite • hammers, picks, shovel, scoops, buckets, bags, sieves and sample containers • coring/excavation equipment (e.g. auger) • hand lens and microscope • pH meter and conductivity meter • chemical field test kits • worksheets, sampling/test methods • portable computers and PDAs
Common landforms	Common landforms may include: • mounds, hills, ridges, cliffs, valleys, rivers, peninsulas and numerous other structural and size-scaled (i.e. ponds vs. lakes, hills vs. mountains) elements, including various kinds of inland and oceanic water bodies and sub-surface features • geological features characterised by physical attributes, such as elevation, slope, orientation, stratification, rock exposure and soil type
Geological processes	Geological processes that are responsible for most landforms may include: • plate tectonics • glaciation • vulcanism • action of wind and water • weathering • mass wasting or erosion • action of groundwater and surface water
Physical properties of common rocks and minerals	Physical properties of common rocks and minerals may include: • composition, texture and structure • colour, streak, crystal form, habit, cleavage, fracture and hardness
Common soil properties	Common soil properties may include: • colour • structure (size and shape of aggregate particles)

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	• texture (varying percentages of sand, silt or clay, and organic matter) • water retention and water repellence • depth to bedrock • pH • chemical properties (e.g. nitrates, sulphates, phosphates and carbonates) • electrical resistivity and conductivity
Soil degradation	Soil degradation may include: • forms of erosion, such as gully, sheet, landslide, tunnel and stream bank • erosion agents, such as wind, water, heating and cooling of rocks, freezing of water in cracks, plant roots, upheaval of trees and chemicals • weathering • decomposition of organic material • salinity • acidification • structural degradation • soil pollution (e.g. hydrocarbons and heavy metals)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

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Custom Content Section

Not applicable.

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MSS024009A Assist with assessing and monitoring stormwater systems

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to inspect and/or monitor small-scale urban or semi-urban drainage systems. Personnel will plan and conduct survey/inspection/audit activities, collect and interpret information about the characteristics and condition of the catchment, and identify environmental issues and possible causes. This work assists engineers and planners to develop stormwater management plans and/or assess the environmental impacts of existing conditions or activities.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- stormwater management
- clean water (e.g. catchments, supply and environmental flows)
- environmental services (e.g. monitoring of water quality)
- environmental compliance, auditing and inspection.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Confirm details of assigned activities with supervisor	1.1	Clarify the scope and objectives of the assessment, constraints, stormwater components involved and stormwater management techniques already in use
		1.2	Identify regulations, standards, guidelines, enterprise procedures that apply to assigned activities
		1.3	Clarify the required outputs, timeframe, available resources and stakeholder involvement
2	Source and assess available stormwater system data	2.1	Locate and obtain existing stormwater system information and review its relevance and accuracy
		2.2	Locate external sources of relevant data sets and assess their availability, price, value and limitations
		2.3	Obtain selected data sets in accordance with enterprise procedures
		2.4	Use available data to identify (sub)catchment boundaries and modifications, ‘hydrologic range’, major land use categories, areas of potential pollution and environmental issues relevant to the study
		2.5	Identify any significant information gaps
3	Plan and organise assigned field activities	3.1	Confirm data collection points and data quality requirements
		3.2	Analyse field activities to identify related tasks and plan efficient sequences
		3.3	Identify risks, safety and environmental requirements associated with field activities
		3.4	Assemble required field equipment and materials and check that they are fit for purpose
		3.5	Liaise with relevant personnel to explain the scope and purpose of field activities, organise site

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			access and obtain permits, as necessary
		3.6	Review work plan in response to new information, changed circumstances or instructions from appropriate personnel
		3.7	Update work plan and communicate changes to appropriate personnel as necessary
4	Safely collect global positioning system (GPS) and environmental data	4.1	Set up/optimise GPS equipment with correct datum and projection settings
		4.2	Set up measuring instruments on site and perform pre-use/calibration checks
		4.3	Operate GPS equipment/measuring instruments in accordance with manufacturer specifications and enterprise procedures
		4.4	Collect point positional data and attribute environmental data for each location in accordance with data collection plan
		4.5	Verify GPS/environmental data, identify atypical results and review procedures/troubleshoot equipment, as necessary
5	Perform field work	5.1	Visually inspect stormwater systems to determine the degree of erosion/sediment transport along drainage channels
		5.2	Assess the apparent effectiveness of current stormwater control devices
		5.3	Assess the state of riparian vegetation associated with earth formed channels, ponds and basins
		5.4	Assess the diversity of vertebrate and invertebrate fauna in stormwater channels and receiving bodies
		5.5	Collect representative water, soil and/or sediment samples using specified sampling methods and equipment
		5.6	Obtain valid and reliable in-situ measurements

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			using specified test methods and equipment
		5.7	Identify litter generation areas and visually inspect the effectiveness of gross pollutant traps
		5.8	Identify and promptly report any illegal discharge to the stormwater system
		5.9	Inspect the condition of flood mitigating structures along drainages
6	Finalise field work	6.1	Pack and safely transport all samples, equipment and supplies back to home base
		6.2	Ensure all samples and data are stored safely
		6.3	Ensure dispatch of collected samples for subsequent analysis
		6.4	Clean and test equipment before storage
7	Report current stormwater system conditions	7.1	Review field measurements and/or results of laboratory analyses to identify significant trends and/or problems with data
		7.2	Analyse data relating to catchment characteristics, existing conditions and management values, as required
		7.3	Identify environmental issues that may impact on current stormwater management objectives/practices
		7.4	Report findings using a format and style that suits the intended use and in accordance with enterprise guidelines
		7.5	Communicate results within the specified time and in accordance with enterprise confidentiality and security guidelines
8	Maintain a safe	8.1	Use safe work procedures and protective equipment to ensure personal safety and that of

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work environment	others	
	8.2	Minimise environmental impacts of testing/sampling and generation of waste
	8.3	Collect and/or dispose of all waste in accordance with environmental requirements and enterprise procedures

Required Skills and Knowledge

Required skills
Required skills include: • interpreting procedures, guidelines and manuals • locating and evaluating stormwater system information • planning and conducting assigned field activities efficiently • making objective observations based on clear criteria • demonstrating correct and safe use of sampling/measuring equipment, including pre-use checks, to obtain valid samples and data • identifying and rectifying basic equipment faults • calculating simple flow rates, scientific quantities, uncertainties and unit conversion factors • analysing findings of field work to produce reliable data and logical conclusions • providing written reports that meet user needs • communicating effectively with others, such as enterprise staff, members of the public, clients, council members and consultants • responding effectively to changed or unforeseen circumstances • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • specific legislation, policies and guidelines relevant to field activities • sources of stormwater system information • terminology and principles of stormwater management • basic design of stormwater transport systems, constructed wetlands and flood mitigation structures • procedures and equipment for collecting soil, water and (micro) biological samples • procedures and equipment for maintaining, storing and transporting samples/specimens to

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ensure their wellbeing, viability and integrity • procedures and equipment for basic water flow and quality measurements • fundamental principles of ecology and assessment of site environmental indicators • environmental factors that impact on soils, water quality, population and diversity of flora and fauna • enterprise procedures for the recording of field data • reporting requirements • protocols for the confidentiality and security of information and communicating with the community and media • relevant health, safety and environment requirements

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • planning and safely conducting surveys/inspections of a range of stormwater system components that meet user needs • accessing and using existing environmental data sets • obtaining reliable field samples and measurements • providing detailed descriptions of catchment characteristics, existing conditions, management values, environmental issues and possible causes • completing all documentation in the required format and timeframe • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024005A Collect spatial and discrete environmental data*

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	• *MSS024006A Perform sampling and testing of water* • *MSS024007A Collect and evaluate meteorological data.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • access to natural and constructed drainage systems and combinations of these • sampling equipment, field instruments and materials • enterprise procedures, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, sampling/measurement procedures and works safely • oral/written questioning associated with inspection/survey of stormwater systems, sampling/measurement equipment and procedures and stormwater assessment techniques • observation of the candidate collecting samples and conducting field tests. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, guidelines, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • Australian and international standards, such as: • AS/NZS 5667 set Water quality • state/territory Environmental Protection Agency (EPA) guidelines and manuals: • Managing urban stormwater: Council handbook (NSW EPA) • Water quality sampling manual (QLD EPA) • Regulatory monitoring and testing: Water and wastewater sampling (EPA SA)
Stormwater survey/inspection/ audit activities	Stormwater survey/inspection/audit activities may include: • broad scale, ‘whole of catchment’ assessment of catchment health • assessment of environmental conditions or risk in a smaller, localised study area or individual premises
Stormwater management plan	A stormwater management plan may include: • existing and future values of a catchment • stormwater management objectives to protect these values • problems and issues that may compromise these objectives • agreed stormwater management practices

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	(non-structural/structural) to mitigate existing impacts and minimise future impacts
Stormwater management techniques	Stormwater management techniques may include: • retention and restoration of existing watercourses and wetlands and riparian/foreshore vegetation, and aquatic habitats • control of source water quality and quantity through minimising impervious areas, stormwater re-use and infiltration, limiting development of flood plains, community education, small on-site treatment measures • 'end of pipe' techniques, such as use of retarding basins, gross pollutant traps, channel stabilisation/design, erosion and sediment control, and large off-site treatment
Stormwater system information	Stormwater system information may include: • terrain models • stormwater drainage plans • flood and drainage studies • water and sediment quality studies • contaminated site reports • aquatic ecology and riparian vegetation studies • land use information, such as topographical maps, aerial photos, satellite imagery and land use/zoning maps • reports of consultations with the scientific community, local environmental groups and industry associations, catchment management committees and councils • history of engineering works and modifications
Field equipment and materials	Field equipment and materials may include: • stormwater drainage maps, topographic maps, aerial photos, compass, survey point markers and drivers, GPS, tape measure, flagging tape and binoculars • data recording sheets, palm pilot, laptop, data logger and digital camera • sampling equipment, such as bottles, bags, biological specimen containers, secateurs, scoop nets, esky, preservatives, water pumps and tubing • automatic water samplers • portable water quality probe that measures dissolved oxygen, temperature, turbidity, pH, conductivity and field test reagents

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	• tipping bucket rain gauge and data logger • flow meters • soil infiltration test rigs • personal protective equipment • appropriate clothing and footwear • phone • first aid kit • insect repellent
Laboratory analyses	Laboratory analyses may include: • suspended solids • total phosphorus • filterable reactive phosphorus • total nitrogen • total Kjeldahl nitrogen • oxidised nitrogen • faecal Coliforms • soil permeability
Catchment characteristics and existing conditions	Catchment characteristics and existing conditions may include: • physical characteristics, such as: • soils and sediments • topography, including slope characteristics • climate, including rainfall, evaporation • bridge and culvert crossings, major utility services that may impact on management practices • point sources of pollution (e.g sewage treatment) • major sewer outflows • existing stormwater management structures (e.g. retarding basins and constructed wetlands) • social characteristics, such as: • recreational areas • land use and land use zoning • waterway characteristics, such as: • stormwater transport via piped, lined or natural channels • characteristics of receiving water bodies (e.g. lakes, reservoirs, wetlands and estuaries) • erosion/sediment transport processes for natural/modified stormwater systems • surface hydrology (e.g. flooding and low flow) • water quality in stormwater transport systems and

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	receiving bodies (dry/wet conditions) • ecological characteristics, such as: • aquatic fauna and flora in stormwater transport systems and receiving bodies • riparian zone fauna and flora • areas of urban bushland
Catchment values	Catchment values may include: • aquatic fauna habitats, such as appropriate substrate, woody debris and aquatic plants • terrestrial fauna habitats, such as riparian zone vegetation • aquatic flora (e.g. macrophytes) habitats, such as appropriate sediment, stream flow and water quality • terrestrial flora habitats, such as morphology of banks/floodplain, prevailing stream flow and groundwater conditions • avifauna (e.g. land-based and water birds) habitats, such as riparian zone, stormwater transport system and receiving water bodies • public health and safety (e.g. risk of bacterial pollution in stormwater run-off) • recreational values • visual amenity of stormwater systems and riparian zone • use of surface or groundwater as a water source • aquaculture and other commercial fishing • reuse of stormwater for (non)potable use • value of properties adjacent to visually attractive constructed wetlands and natural channels
Environmental issues and possible causes	Environmental issues and possible causes may include: • poor water quality in waterways (wet/dry conditions) due to excess fertiliser application, washing of cars in streets, sewer overflows, domestic animal droppings and atmospheric deposition • inappropriate stream flow regime (flooding, base flows) due to increased run-off from impervious areas and insufficient stormwater reuse • degraded aquatic habitats due to increased sediment deposition, removal of riparian vegetation • barriers to aquatic fauna migration weirs • degraded riparian vegetation due to introduction of exotic species and vegetation removal • channel erosion and sedimentation due to increased

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	flood flows following urbanisation and vegetation removal • litter in watercourses due to insufficient number/emptying of rubbish bins and commercial waste • weed growth in urban bushland due to stormwater nutrients, weeds from residential gardens, and removal of canopy vegetation • degradation of ecologically sensitive water bodies • health risks associated with recreational use of polluted waters • low visual amenity and landscape value due to litter along watercourses and concrete lined channels
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024010A Perform environmental biological techniques

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to collect and examine biological samples using microscopes, keys and biochemical tests to identify and enumerate environmentally significant organisms. Personnel are expected to prepare aseptic media and solutions, set up equipment for microbiological testing and identify basic microorganisms of environmental significance.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water and soil)
- clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Obtain biological samples	1.1	Locate and review background information for site/project
		1.2	Review work request to identify required samples and the procedures, materials and equipment involved
		1.3	Identify hazards and enterprise control measures associated with collecting the sample, preparation methods, reagents and/or equipment
		1.4	Assemble required materials, reagents and equipment and check that they are fit for purpose
		1.5	Collect samples in accordance with relevant legislative requirements, codes of practice and enterprise procedures
		1.6	Log samples using enterprise procedures
		1.7	Record sample description, compare with specification and note and report discrepancies
		1.8	Ensure traceability from receipt of sample to reporting of results
2	Perform basic biological techniques associated with the examination of microorganisms	2.1	Use aseptic techniques to prepare media for microbiological analysis
		2.2	Obtain samples aseptically for microbiological analysis
		2.3	Identify possible contamination pathways for both samples and media
		2.4	Perform simple chemical tests to identify morphology of environmentally significant bacteria
		2.5	Use aseptic techniques to manipulate samples and bacterial cultures
		2.6	Use standard techniques to grow cultures of environmentally significant microorganisms
		2.7	Use disinfection and sterilisation to control the

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			growth of microorganisms
3	Prepare microscope for use	3.1	Select appropriate microscope and attachments for examination and measurements
		3.2	Check that all microscope components are clean and fit for purpose
		3.3	Mount sample in accordance with specified method
		3.4	Adjust settings and alignment of optical and mechanical components to optimise performance
4	Perform microscopic examination in accordance with test methods	4.1	Identify microorganisms, cell structures and components of animal/plant tissues in environmental samples
		4.2	Measure organisms and structures
		4.3	Enumerate microorganisms in environmental samples
5	Classify organisms	5.1	Classify organisms into hierarchical structures using appropriate keys
		5.2	Record all observations and measurements used to determine classifications
6	Relate cell structures and their functions to environmental adaptation	6.1	Identify cell structures from examination of biological specimens
		6.2	Associate biological functions with cell structures
		6.3	Associate cell physiology and enzyme cycles to environmental adaptation
		6.4	Identify important biochemical pathways associated with environmentally significant organisms

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7	Maintain a safe work environment	7.1	Ensure safety and minimise cross-contamination through the use of personal protective clothing and safety equipment
		7.2	Handle all samples and equipment in accordance with enterprise safety procedures
		7.3	Clean up spills using appropriate techniques to protect personnel, work area and environment
		7.4	Minimise generation of waste and environmental impacts
		7.5	Collect and dispose of all wastes safely
		7.6	Report hazards and incidents to designated personnel using enterprise procedures
8	Maintain enterprise records	8.1	Record approved data into enterprise system
		8.2	Maintain confidentiality and security of enterprise information and data

Required Skills and Knowledge

Required skills
Required skills include: • interpreting instructions, manuals and applying enterprise procedures • logging and tracking samples from collecting or receiving a sample through to completion of a procedure and reporting • performing tasks associated with the culture and isolation of microorganisms • setting up, cleaning and using a light microscope to achieve optimum resolution of the specimen • identifying artefacts or image aberrations attributable to misalignment or obstruction of light paths or condensers used in bright field, dark ground, and phase contrast microscopy, or with other steps in microscopic examinations • performing basic microscopic examination of materials to enumerate and identify microorganisms, and identify important components of plant and animal tissues • interpreting and recording test results, including simple calculations/estimations • using personal protective clothing and other safety equipment correctly • preventing contaminating of oneself, other people, the work area, equipment or the samples

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under test • sterilising materials, disinfecting spillage, and safely disposing of all contaminated waste • decontaminating the work area upon completion of work • storing/disposing of samples and cleaning/storing equipment • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • principles and terminology used in elementary microbiological testing, organism classification, microscopic examination and cell structure • hazards, risks and controls associated with handling microorganisms • common sampling techniques for air, water, soil in a range of terrestrial and aquatic habitats • the relationship between sterile practices, hygiene procedures and the ability to obtain growth of microorganisms free of contamination • importance of pure culture techniques and aseptic transfer to successful microbiological investigation and correct interpretation of results • growth requirements of microorganism cultures (e.g. bacteria, fungi and yeasts) • principles of infection control related to occupational health and safety (OHS), sampling and transfer of materials in microbiological investigations • disinfection and sterilisation procedures used in the collection, processing and safe disposal of samples and materials • cleaning and sanitising requirements of equipment and work area and effects of physical and chemical agents on microbial growth and death • parts and functions of common microscopes, set-up procedures and common causes/solutions for sub-optimal performance (e.g. fringing) • basic structure and function of cells and organelles • basic classes and classification of organisms • cell physiology and processes, such as simple and facilitated diffusion, plasmolysis, osmosis, tonicity, active transport, energy production, mitosis, motility, phagocytosis and pinocystosis • purposes and mechanisms of staining (e.g. Gram +ve and -ve) • enterprise and/or legal traceability requirements • relevant safety procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to

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	perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • collecting and handling biological samples • using aseptic techniques to obtain/manipulate samples and prepare media • using standard techniques to grow cultures of environmentally significant microorganisms • setting up and optimising the performance of light microscopes • conducting tests and microscopic examination of samples to identify and enumerate environmentally significant (micro)organisms and important components of plant/animal tissues • demonstrating safe sterilisation, disinfection, cleaning and waste disposal techniques • preparing documentation that is concise, accurate and meets enterprise requirements • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL952001A Collect routine site samples* • *MSS024006A Perform sampling and testing of water* • **environmental monitoring units, such as:** • *MSS024009A Assist with assessing and monitoring stormwater systems* • *MSS025013A Assist with assessing and monitoring wetlands*. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • relevant sampling equipment and materials • standard microbiology laboratory with relevant equipment, materials and reagents • enterprise procedures, test methods and equipment

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	manuals. Under duty of care requirements, off-the-job training providers will only use biological samples and organisms of a risk category that is compatible with their laboratory as defined in *AS/NZS 2243.3:2010 Safety in laboratories - Microbiological aspects and containment facilities.*
Method of assessment	The following assessment methods are suggested: • inspection of samples and review of data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures and works safely • oral/written questioning associated with sampling, safe handling, culturing, testing and examination of microorganisms, and their identification • observation of the candidate handling samples/cultures, optimising a light microscope for identified samples, classifying organisms or performing basic environmental microbiological testing. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

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Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with issues, such as: • environmental protection • nature conservation, wildlife/plant protection, prevention of cruelty to animals and quarantine • codes of practice dealing with the care and use of animals for scientific purposes • Australian and international standards, such as: • AS/NZS 2243.3:2002 Safety in laboratories - Microbiological aspects and containment facilities • AS/NZS 4276 series Water microbiology • Australian and New Zealand Guidelines for fresh and marine water quality • American Public Health Association (APHA) Standard methods for examination of water and wastewater • cleaning, hygiene, personal hygiene requirements • enterprise procedures, standard operating procedures and operating manuals • incident and accident/injury reports • instructions to comply with new legislation, standards, guidelines and codes • quality system and continued improvement processes • safety requirements for equipment, materials or products and material safety data sheets (MSDS) • sampling procedures (labelling, preparation, storage, transport and disposal) • test procedures (validated and authorised) • waste minimisation, containment, processing and disposal procedures
Equipment, materials and systems	Equipment, materials and systems may include: • sampling equipment for different sample types and species, such as: • air samplers (e.g. for *Legionella*) • nets (e.g. for plankton) • sediment samplers • soli samplers (e.g. Niskin and Nansen)

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	• protective and physical containment facilities and equipment for safe handling of microorganisms, including personal protective equipment, such as gloves, gowns, masks and safety glasses, and gloves for working with extremes of heat and cold • carbon dioxide cabinets and incubators • transfer equipment, such as inoculating loops, pipettes (quantitative and qualitative), flasks, tubes and spatulas • liquid nitrogen containers for cell storage • filtration membranes • microscopes with bright field and other relevant illumination systems and stereomicroscopes • counting chambers for micro-enumeration • colony counting devices • Bunsen burners and bench incinerators • incubators and water baths • anaerobic jars, fermentation chambers, continuous culture systems and other devices for controlling growth environments of microorganisms • laboratory information management systems (LIMS), reference databases, record and filing systems • stains, media, reagents and biological materials necessary for laboratory testing • laboratory glassware and measuring equipment • disinfecting and sterilising solutions and equipment, such as ultraviolet (UV) lamps • materials suitable for the safe containment, collection, processing and disposal of biological and non-biological wastes • autoclaves
Samples	Samples may include: • air • surface water, wastewater and stormwater • soils and sediments • plants and animals
Aseptic techniques	Aseptic techniques may include: • preparation of basic and enriched media • sterilisation of media • aseptic transfer of microorganisms (e.g. bacteria, fungi and yeasts) to culture media • production and identification of pure cultures on solid media

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	• production of contaminant-free cultures in liquid media
Microscopes and microscopy techniques	Microscopes and microscopy techniques may include: • bright field microscopy • dark field microscopy techniques • Kohler illumination and its importance in producing uniform and glare-free images • phase contrast microscopy • polarised light microscopy • stereo microscopy techniques • image analysers and camera eyepieces • stage micrometers and microscopic measurement • counting chambers
Organism classification	Organism classification may include: • kingdoms • hierarchical system of species classification • dichotomous keys
Cell structure and function	Cell structure and function may include: • cell theory • eukaryotic and prokaryotic cells and their organisation • cell organelles and structures, including plasma membrane and cell wall, chromosomes, nucleus, cytoplasm, vacuoles and vesicles, golgi complex, endoplasmic reticulum, lysosomes, chloroplasts, ribosomes and mitochondria, cytoskeleton, cilia and flagella • biological membranes (structure and function - osmosis, diffusion, active transport cellular metabolism) • heterotrophic and autotrophic organisms
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by

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	the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024011A Navigate in urban, regional and remote areas

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to read and interpret maps, plans and photos to locate position and navigate safe and efficient routes to urban and regional/remote destinations. This unit does not cover conducting field work in remote locations.

Application of the Unit

This unit of competency is applicable to environmental technicians working in all industry sectors as well as a wide range of other technicians, paraprofessionals, operators and drivers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Navigate in urban areas	1.1	Access relevant street directories and road maps
		1.2	Recognise and interpret map symbols
		1.3	Use the directory index to locate departure and destination points on map

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		1.4	Trace the pre-determined or most efficient route on map and estimate distance and duration of journey
		1.5	Identify significant intersections/landmarks along route to assist with navigation
		1.6	Identify alternate routes in case of emergencies or significant traffic delays
		1.7	Follow selected route correctly
2	Plan routes in regional/remote areas	2.1	Locate and review relevant legislative/regulatory, enterprise requirements and background information for site/project
		2.2	Select suitable maps, aerial photos, guides and/or charts and check their currency and accuracy
		2.3	Select navigational equipment, check that it is fit for purpose and service or replace, as necessary
		2.4	Interpret map symbols and navigation data to identify departure/destination points, potential hazards and select an appropriate traverse route
		2.5	Estimate distance and duration of journey using map scale and available information about the terrain and vehicle
3	Navigate in regional/remote areas	3.1	Correctly orientate map with surroundings
		3.2	Identify field position and destination on map using landforms, landmarks and/or navigation equipment
		3.3	Correctly use navigation aids, equipment and maps to follow planned route and schedule
		3.4	Use alternate routes to avoid hazards, safely bypass obstacles or improve efficiency of route
		3.5	Maintain communication in accordance with enterprise procedures

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Required Skills and Knowledge

Required skills
Required skills include: • applying legislative/regulatory and enterprise procedures (e.g. access, permits, environmental protection and safety) • using literacy skills to interpret maps, manuals and procedures • using mathematical skills to estimate distance, measure angles, average speed and time • recognising potential hazards, surroundings and navigational aids • solving problems, such as determining alternate routes • closely attending to details, such as the timely reading/interpreting of maps and rapid recognition of landforms/landmarks • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • types of maps, charts, aerial photos and advantages/disadvantages of their use • use and manipulation of scales used on maps and plans • symbols and representation of topographical features on maps and plans • functional components of a compass/global positioning system (GPS) and factors affecting compass/GPS accuracy • techniques for estimating distance and taking bearings

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • locating, interpreting and applying relevant maps,

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	route requirements and site/project information • interpreting surroundings, maps and navigation data in a timely manner • identifying and safely following a pre-determined route • developing safe, alternative routes in response to unforseen/changed circumstances • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with **any field-based monitoring/survey unit, such as:** • *MSS024008A Recognise common geological landforms and samples* • *MSL974007A Undertake environmental field-based monitoring* • *MSL974009A Undertake field-based, remote sensing.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history and reports • relevant enterprise procedures (e.g. safety and travel) • physical resources required for navigation task, such as maps, laptop computer/internet, GPS, compass and photos.
Method of assessment	The following assessment methods are suggested: • review of field work/transport records prepared by the candidate • feedback from peers and supervisors that the candidate can navigate accurately and consistently, follows enterprise procedures and works safely • oral/written questioning associated with planning routes and use of maps and navigation data • observation of the candidate navigating a variety of routes. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • enterprise or regulator procedures for sampling,

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	monitoring and in-field testing • material safety data sheets (MSDS) • vehicle and equipment manuals • safe work procedures
Background information	Background information may include: • site or project history, and project reports • client history • records of consultations with stakeholders and current issues • details of local inhabitants, landowners • site access protocols and permits • site access and exit routes • maps, guide books and aerial photos • information about terrain, significant features, natural protection or shelter, and cultural heritage sites • existing databases (e.g. vegetation, topography, soils and regional ecosystem maps) • safe work procedures • communication protocols when working in remote/regional areas • emergency plan and response procedures
Maps	Maps may include: • cadastral maps showing land tenure/ownership • topographical maps • charts and guidebooks • aerial photos, sketch maps and diagrams • web-based maps and directories • street directories
Navigational equipment and aids	Navigational equipment and aids may include: • GPS units • compass • track and survey markers, cairns, signs and arrows • navigation beacons
Map symbols and navigation data	Map symbols and navigation data may include: • map legend and scale • entry and exit routes • distances and estimated travel times • grid lines and numbers, and grid reference points • contour lines, gradient and altitude gain/loss • magnetic variation/declination, grid and magnetic

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	bearings • identifiable features (natural and built) • navigation/survey markers, beacons and water depth
Surroundings	Surroundings may include: • terrain, such as hills, mountains, ridges and valleys • natural landforms/landmarks, such as caves, observation towers, trig stations, bridges, buildings, and track and creek junctions/crossings • water bodies, such as creeks, rivers, dams and lakes
Hazards and obstacles	Hazards and obstacles may include: • extreme weather, such as wind, rain, fog and snow • damage to roads and tracks • thick/impenetrable vegetation • unsafe gradients • marshes, soft sand or bogs • impassable water crossings
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS024012A Undertake simple environmental project activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to carry out straightforward aspects of environmental projects, such as researching basic site information and performing routine sampling, monitoring and data management. Personnel may work individually, or as part of a team. They are expected to confirm the project brief/plan with their supervisor, carry out the assigned project activities and maintain progress through to the project's completion. The unit does not cover procurement of project resources and contract management.

Application of the Unit

This unit of competency is applicable to environmental technicians working in all industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Review project documentation and requirements	1.1	Clarify details of project brief and plan with supervisor
		1.2	Identify regulations, standards, codes and enterprise procedures that apply to project

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			activities
		1.3	Analyse the project plan to confirm outputs, timeframe, risks and controls, roles and responsibilities and stakeholder involvement
		1.4	Confirm performance indicators, milestones, deliverables and available resources for assigned project activities
2	Plan and organise assigned activities	2.1	Locate and review background information for site/project
		2.2	Prioritise project activities as directed
		2.3	Break down project activities into small achievable components and efficient sequences
		2.4	Identify and assemble required resources
		2.5	Liaise with relevant personnel to organise site access and permits, as necessary
		2.6	Review work plan in response to new information, changed circumstances or instructions from appropriate personnel
		2.7	Update work plan and communicate changes to appropriate personnel, as necessary
3	Complete assigned activities	3.1	Cooperate with stakeholders and/or team members to achieve agreed outcomes, timelines and outcomes
		3.2	Apply technical knowledge and skills to safely conduct assigned tasks in accordance with project requirements
		3.3	Collect, verify and store project data in accordance with enterprise procedures
		3.4	Seek assistance from relevant personnel when difficulties are beyond scope of technical competence or responsibility

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4	Monitor and maintain project progress	4.1	Monitor and record completion of activities and progress towards milestones
		4.2	Recognise problems and opportunities for improved work performance
		4.3	Use agreed strategies to tackle challenges and solve problems
		4.4	Identify and access appropriate sources of help, as necessary
		4.5	Provide progress reports in accordance with project requirements
5	Finalise project activities	5.1	Provide project deliverables on time and at the required quality standard
		5.2	Evaluate the project process and identify any issues and opportunities for continuous improvement
		5.3	Prepare project reports containing the required information and using the agreed style, voice and format
		5.4	Complete and store all project documentation
		5.5	Brief supervisor about project process and outcomes

Required Skills and Knowledge

Required skills
Required skills include: • planning and organising resources for assigned project tasks • following legislative requirements, standard methods and enterprise procedures • collecting, collating and recording simple environmental information • processing and presenting simple quantitative environmental data • using and maintaining equipment to undertake assigned project activities • preparing brief oral/written reports and project presentations

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• seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • enterprise project planning, management and reporting requirements • environmental terms, concepts and principles relevant to assigned project activities • enterprise and regulator sampling, monitoring and testing procedures that apply to assigned project activities • enterprise procedures for identifying/assessing and controlling hazards/risks associated with project activities • relevant health and safety requirements and enterprise safe work procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • following relevant enterprise procedures • using available project management procedures and tools to plan assigned tasks and monitor/report progress • providing quality deliverables on time • seeking advice/assistance when difficulties are beyond scope of responsibility or technical competence • identifying opportunities for improvement during project activities • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and

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	procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024000A series environmental monitoring, sampling, and testing units* • *MSL974007A Undertake environmental field-based monitoring* • *MSL974009A Undertake field-based, remote sensing.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history • relevant enterprise environmental project management procedures, tools and checklists • physical resources required for work activities, such as maps, laptop computer, digital camera, and monitoring and sampling equipment.
Method of assessment	The following assessment methods are suggested: • review of work breakdown structure, work plan and reports prepared by candidate • presentation of project process and deliverables to an appropriate audience • feedback from peers and supervisors about the candidate's ability to follow enterprise procedures and complete project activities/deliverables on time and within budget • oral or written questioning to check underpinning knowledge of environmental and project management requirements for assigned tasks. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.

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Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • enterprise or regulator procedures for sampling, monitoring and in-field testing • enterprise procedures and tools for project management • material safety data sheets (MSDS) • safe work procedures
Environment	The environment comprises the surroundings in which an enterprise and/or industry operates, and may include: • air, water and land • natural and built resources

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	• flora and fauna • humans and how they interrelate
Simple environmental project activities	Simple environmental projects may include collecting and presenting data related to: • air quality • water quality • ecology studies • soil surveys • hydrological surveys • land management • coastal management • wetland management • stormwater management • waste management Simple project activities could involve real or simulated work activities and may include: • sourcing and collating available information about environmental sites or simple issues • sampling • in-field testing • conducting simple flora and/or fauna surveys • checking data files • presenting data in useable formats
Project brief	Project brief may include an outline of: • aims/expectations/rationale • project activities • assigned tasks and deliverables
Project plan	Project plan may include: • scope • objectives • work breakdown structure • available resources (e.g. equipment and team) • specific roles and responsibilities • budget and cost estimates • milestones • quality requirements and assurance procedures • risk analysis and control measures • safety requirements and related work procedures • stakeholders and consultation procedures • project management procedures, including reporting

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Background information	Background information may include: • site or project history • client history • records of consultations with stakeholders • emergency plans and safety procedures • site access protocols and permits • maps (road and topographical) • existing databases (e.g. vegetation, topography, soils and regional ecosystem maps)
Sites	Sites will vary with the scope of the enterprise's activities, and may include: • public places • industrial settings (e.g. manufacturing, mining, forestry and construction) • roadways • indoors • farms • domestic locations • waterways and catchment areas • natural heritage or conservation areas
Project data and documentation	Project data and documentation may include: • sampling, monitoring or in-field test data and results • records of vehicles/equipment use • records of time spent and approved expenditure • emails and correspondence • records of consultations • progress reports • final reports/briefings
Agreed problem-solving strategies	Agreed problem-solving strategies may include: • researching and applying more efficient methods of completing project tasks • seeking technical advice • sharing expertise and assisting team members • reducing costs • seeking further resources • negotiating an extension of deadlines or redefining deliverables • changing roles and responsibilities within the project team

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Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025001A Assist with assessing site environmental indicators

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to assist environmental scientists and engineers with determining the environmental condition of a site or locality. Personnel are required to locate and assess relevant data sets and reports, interpret the magnitudes and trends in measured environmental parameters, and determine and report on the potential significance for site/locality activities. This requires sufficient knowledge of environmental science to interpret measurements involving the atmosphere, biodiversity, land and water. The unit does not cover the collection of field data.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- management of contaminated sites
- site remediation/rehabilitation
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024003A	*Apply an understanding of environmental principles to a site*

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Review existing site and/or locality information	1.1	Confirm the scope of the proposed project activity or process and details of the site and/or locality
		1.2	Identify relevant legislative, regulatory and/or planning requirements
		1.3	Access and interpret available, relevant information about the site and/or locality
		1.4	Summarise existing data and relate it to legislative, planning or other statutory requirements
2	Identify relevant environmental indicators for site and/or locality	2.1	Determine which environmental indicators and/or statutory environmental quality concentration limits are relevant to the proposed project activity, process and/or requirements of the site/locality
		2.2	Identify relevant core environmental indicators and collect and collate data
		2.3	Identify relevant statutory environmental quality concentration limits and collect and collate data
		2.4	Identify additional site/locality/project specific environmental indicators and collect and collate data, if available
		2.5	Identify gaps in available data and refer to supervisor for further action
3	Analyse data to establish site	3.1	Ensure compatibility of data sets and seek advice, as necessary

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	condition	3.2	Compare compatible data with core environmental indicators, established standards, regulatory limits, and statutory environmental quality concentration limits or similar
		3.3	Apply relevant environmental chemistry and biodiversity concepts and principles to estimate the 'environmental health' of the site/locality
		3.4	Identify significant trends in environmental data and correlations and differences with relevant indicators
		3.5	Make an assessment of site condition
4	Report findings	4.1	Report the assessment of environmental condition in the required format and expected timeframe
		4.2	Brief supervisor and/or stakeholders about the environmental assessment process and outcomes

Required Skills and Knowledge

Required skills
Required skills include: • researching and interpreting legislative, enterprise and site requirements • collecting and compiling/collating data that is potentially relevant to an assessment of site environmental pollution and/or degradation • comparing expected or known site environmental parameters with accepted background levels or conditions and determining significance for site/project • using computer software (e.g. databases, spreadsheets and specialist programs) • defining and solving problems where alternatives are not obvious and where investigations may be required and the implications of various solutions considered • seeking advice when issues/problems are beyond scope of competence/responsibility • writing reports using enterprise formats and guidelines • presenting findings to stakeholders
Required knowledge

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Required knowledge includes:

- appropriate scientific terminology relevant to environmental indicators, environmental pollution and environmental degradation
- fundamental concepts and principles in chemistry, physics, geology and biology to support a scientific, systematic approach to the evaluation of environmental degradation
- fundamentals of environmental chemistry, including:
- natural and modified hydrologic cycle
- aquatic chemistry in natural and polluted waters
- water pollutants (e.g. heavy metals, inorganics, organics, nutrients and pesticides)
- atmosphere and its composition, structure and circulation
- atmospheric stability and instability (e.g. lapse rates and inversions)
- atmospheric pollutants (e.g. particulates, inorganic air pollutants and organic air pollutants)
- awareness of climate change science
- soil chemistry
- hazardous wastes and toxicological chemistry
- concepts of biodiversity stresses, including:
- land clearing and loss of habitat
- threatened and vulnerable species and ecological communities
- introduced species
- specific legislation, strategies, policies and codes of practice related to environmental pollution and biodiversity
- relevant health, safety and environment requirements

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative and planning framework that applies to environmental site appraisal • researching, reviewing and concisely documenting site environmental history using appropriate scientific terminology

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	• identifying relevant environmental indicators for site and/or locality • analysing available data in comparison with core environmental indicators, established standards, regulatory limits, and statutory environmental quality concentration limits or similar • applying a working knowledge of relevant terminology, concepts and principles in geology, geomorphology, hydrology and ecology to provide a systematic, scientific appraisal of site environmental condition.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025002A Assess the environmental risk or impact of a project activity or process* • *site-specific units, such as:* • *MSS025013A Assist with assessing and monitoring wetlands.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • state of the environment reports, national environment protection measures, ANZECC Core environmental indicators documentation • environmental databases (electronic, web-based and hardcopy) • national and state/territory environmental management strategies, guidelines and regulations.
Method of assessment	The following assessment methods are suggested: • review of reports about assessment of site environmental condition prepared by candidate • feedback from peers and supervisors • oral and written questioning to check underpinning knowledge of assessing the environmental condition of sites • review of workplace documentation completed by the candidate. In all cases, practical assessment should be supported by

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	questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation, wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management -

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	Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental management basic set • ANZECC Core environmental indicators for reporting on the state of the environment • National strategy for the conservation of Australia's biological diversity • OECD Key environmental indicators • US Environmental Protection Authority (EPA) Environmental indicators gateway • national environment protection measures • ANZECC Guidelines for fresh and marine water quality • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements and specific environmental standards
Project activity or process	Project activity or processes will be of a complexity consistent with the role of an environmental officer working under the supervision of an environmental scientist, engineer or planner, and may include contributions to: • environmental studies • environmental impact statements • environmental impact assessments • environmental monitoring programs
Site or locality information	Site or locality information may include: • notice of intention and initial advice statement • environmental impact assessment • environmental impact statement • public environment report • environmental indicators • national environment protection measures • statutory environmental quality concentration limits • data in existing databases, such as vegetation, topography, soils and regional ecosystem maps • geological, hydro geological, ecological and meteorological data for site • environmental management plans for specific site, locality or project • site environmental management procedures and actions for specific issues • site environmental management action checklists

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	• relevant site reports, case studies and good practice models
Site-relevant environmental indicators	Site-relevant environmental indicators may include: • atmospheric indicators, such as: • exceedances of national environment protection measures • air quality standards for gases and particulates • emissions of air pollutants • greenhouse gas emissions and atmospheric concentrations • water indicators, such as: • water salinity • exceedences of groundwater and surface water quality guidelines • water extraction versus availability • environmental flows objectives • health of aquatic habitats • wastewater treatment • estuarine and marine water quality • land indicators, such as: • salinity and acidity • potential for erosion • exceedences of maximum residue levels • biodiversity indicators, such as: • threatening processes • loss of biodiversity • biodiversity conservation management
Environmental chemistry principles and concepts	Environmental chemistry principles and concepts may include: • biogeochemical cycles • aquatic chemistry • aquatic microbial biochemistry • water pollution, such as: • trace elements and heavy metals • inorganic pollutants • trace organic pollutants • sewage (e.g. biological oxygen demand (BOD), pathogens and detergents) • chemical carcinogens • sediments • radionuclides

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	• water and wastewater treatment • atmosphere and atmospheric chemistry, such as: • structure and composition • inversions and air pollution • meteorology, weather and climate • atmospheric particulates • inorganic air pollutants, including CO, SO_x, NO_x, acid rain, ammonia and chlorine compounds • organic air pollutants and photochemical smog • soil chemistry, such as: • soil and agriculture • macronutrients and micronutrients in soil • contaminated soil • soil loss and degradation • environmental chemistry of hazardous wastes • environmental toxicological chemistry
Biodiversity principles and concepts	**Biodiversity principles and concepts** may include: • scope (levels) of biodiversity, such as genetic diversity, species diversity and ecosystem diversity • biodiversity attributes, such as components, patterns and processes • bioregional planning and management • biodiversity and the balance between conservation and ecologically sustainable development • biodiversity and ecosystem health, such as soil fertility, clean freshwater and clean air • managing threatening processes, such as: • land clearing and habitat loss • alien species • pollution control • fire • climate change • local, state, national and international legislative and policy frameworks
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to

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	be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025002A Assess the environmental risk or impact of a project activity or process

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to evaluate the risks or impacts associated with a specific project activity or process. It includes researching and describing the activity/process and local environment, identifying relevant environmental issues, assessing environmental risks or impacts, and then identifying appropriate environmental management actions and/or alternatives. Personnel will have access to an enterprise environmental management plan for the site and/or a checklist to guide risk/impact assessment of the activity or process against enterprise, community, and/or legislative requirements. They work under the supervision of environmental managers, scientists, engineers and/or planners.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, odour, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation/rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024003A Apply an understanding of environmental principles to a site

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Clarify the project activity or process and environmental management framework	1.1	Review the history of the project activity or process and scope of the required risk/impact assessment
		1.2	Identify relevant legislative, regulatory and/or licensing requirements
		1.3	Access and interpret available information about the site, including relevant enterprise environmental management documents and/or risk assessment guidelines
		1.4	Prepare a detailed description of all phases of the project or process and the site/project environment
		1.5	Confirm project/process details, risk assessment procedure and risk assessment criteria with supervisor
2	Identify environmental issues for project activity or process	2.1	Consult with enterprise personnel to identify relevant environmental issues
		2.2	Seek supervisor's advice if input from community representatives and/or environmental specialists may be required
		2.3	Identify significant hazards and short/long-term risks associated with the process or project activity
		2.4	Analyse each part of the process or project for impacts on the physical, biological and social components of the local environment and

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			ecological linkages operating at the site
		2.5	Identify both positive and negative impacts
3	Assess environmental risks and impacts	3.1	Use agreed assessment criteria to evaluate project activity or process against relevant legislative, regulatory and/or licensing requirements, site terms/conditions, community values, and enterprise environmental management policies/plans
		3.2	Summarise all significant environmental risks or impacts and the evidence used to justify the assessment
4	Evaluate alternatives	4.1	Review enterprise environmental management documents to identify specified methods for controlling risks and minimising impacts at the site
		4.2	Work with relevant enterprise personnel and experts to consider alternative solutions, as necessary
		4.3	Identify possible amendments to project activities, alternative processes or improved environmental management actions to minimise risks or impacts
		4.4	Identify feasible and economically viable solutions and document the case for adopting them
5	Report findings	5.1	Report the assessment of environmental risks or impacts in the required format and expected timeframe
		5.2	Brief supervisor and/or stakeholders about the environmental assessment process and outcomes

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Required Skills and Knowledge

Required skills
Required skills include: • interpreting and applying legislative, enterprise and site requirements and procedures • planning and conducting environmental project work • listening and communicating effectively with clients, environmental scientists/engineers and community members • identifying and assessing hazards, environmental risks and impacts using established assessment criteria and enterprise procedures • using computer software (e.g. databases, spreadsheets and specialist programs) • defining and solving problems where alternatives are not obvious and where investigations may be required and the implications of various solutions considered • seeking advice when issues/problems are beyond scope of competence/responsibility • writing reports using enterprise formats and guidelines • presenting findings to stakeholders
Required knowledge
Required knowledge includes: • environmental terms, concepts and principles relevant to project activities or processes • awareness of environmental management documentation (e.g. environmental impact assessment, environmental impact assessment and public environment report) and environmental assessment process required for new major projects or developments • awareness of roles, functions and responsibilities of environmental officers, environmental scientists, engineers and planners, and regulators • relevant legislation, regulations, licences and permit requirements for enterprise operations at site • enterprise environmental management framework of policy, procedures and management plans for site • project activities or process phases • enterprise procedures for identifying/assessing and controlling hazards/risks/impacts associated with project activities or processes on site • typical kinds of impacts of project activities or processes on the physical and ecological environment, infrastructure, land use, social issues and community values • enterprise project planning, management and reporting requirements • relevant health and safety requirements and enterprise safe work procedures

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered by this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • interpreting and applying enterprise procedures and tools for conducting assessments of environmental risks or impacts • identifying the significant environment risks and impacts for specified project activities or processes • logically assessing risks and impacts using enterprise assessment criteria • evaluating existing methods for controlling risks and minimising impacts, and suggesting improvements or practical alternatives • recognising the limits of their technical competence, role and responsibility • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025015A Plan and conduct environmental project work.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • enterprise environmental management documentation for site • enterprise risk assessment procedures and tools.
Method of assessment	The following assessment methods are suggested: • review of reports of risk/impact assessments for project activities or processes prepared by the candidate • feedback from peers and supervisors that the

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	candidate consistently follows enterprise risk assessment procedures and works safely • oral/written questioning about environmental risk/impact assessment tasks typically conducted by environmental officers under supervision. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection

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	• water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • enterprise or regulator procedures for sampling, monitoring and in-field testing • enterprise procedures and tools for assessment of environmental risks and impacts • material safety data sheets (MSDS) • enterprise environmental management plans for sites and projects • safe work procedures
Project activity or process	The project activity or process will be of a complexity consistent with the role of an environmental officer working under the supervision of an environmental scientist, engineer or planner, and may include: • construction activities • plant operations • functions and processes relocating to new premises • changes in processes involving changes in use of products or generation of waste • production of new materials • any work activities with significant risk to, or potential impact on, the environment
Enterprise environmental management documents	Enterprise environmental management documents may include: • notice of intention, initial advice statement • environmental impact assessment • environmental impact statement • public environment report • environmental management plans for specific sites and projects • site environmental management procedures and actions for specific issues • site environmental management action checklists • quality verification checklists • work method statements • job hazard analyses • reporting forms

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Site or project environment	Site or project environment may include: • physical, biological and social components • land uses and tenures • climate • geology, landforms and soils • surface and groundwater, water quality and hydrology • air quality and dust • noise • pollutants and contaminants • vegetation, plant diseases, clearance and weeds • animal life, habitats, mobility and threats • rare and endangered species • community infrastructure • ethnography of area • archaeology • regional and local demography
Environmental issues	Environmental issues may include: • physical issues, including: • significant land disturbance, erosion, subsidence and instability • alteration of water courses • effects on quality, quantity or availability of surface water or groundwater • salination of water or land • acid drainage • heavy metal contamination • impact on coastal or marine landforms • ecological issues, including: • direct impacts on vegetation • loss of habitat • displacement of fauna • impact on ecological processes and linkages • loss of biodiversity • potential for spreading plant diseases and noxious weeds • impact of toxic or hazardous materials • creation of new habitats • land use issues, including: • major changes of land use • compatibility of development with surrounding land

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	uses • preclusion of alternative land use (e.g. conservation or recreation) • increased demand on scarce natural resources • creation of new water storage and supplies • creation of opportunities for alternative beneficial land uses • social issues, including: • influx of population • impact on health and safety • changes in community character • creation of employment • increased revenue for local communities • community and cultural aspects • infrastructure issues, such as load on existing roads • impact on services, including utilities, health, education and community services
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025003A Report environmental data

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to perform scientific calculations, process and interrogate environmental data sets, analyse trends and uncertainty in data, and report results within the required timeframe. The unit requires personnel to solve problems where alternatives are not obvious and where investigations and trials may be required and the implications of various solutions considered.

Application of the Unit

This unit of competency is applicable to environmental technicians working in all industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024004A Process and present environmental data

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Perform scientific calculations	1.1	Ensure raw data are consistent with expectations and reasonable ranges

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		1.2	Calculate scientific quantities involving algebraic, power, exponential and/or logarithmic functions
		1.3	Ensure calculated quantities are consistent with estimations
		1.4	Present results using the appropriate units, uncertainties and number of significant figures
2	Determine variation and/or uncertainty in data distributions	2.1	Organise raw data into appropriate frequency distributions
		2.2	Calculate means, medians, modes, ranges and standard deviations for ungrouped and grouped data
		2.3	Interpret frequency distributions to determine the characteristics of the sample or population
		2.4	Calculate standard deviations and confidence limits for means and replicates
		2.5	Estimate the sampling error and/or uncertainty in data using statistical analysis
		2.6	Determine data acceptability using statistical tests and enterprise procedures
3	Interpret data and related statistics	3.1	Recognise significant trends in data
		3.2	Use standard statistical methods to test for an association or correlation between variables
		3.3	Use standard statistical methods to test hypotheses involving the same variable between samples, samples with more than one variable and for paired samples
		3.4	Verify data interpretation with supervisor, as necessary
4	Check for aberrant	4.1	Identify data that cannot be reconciled with sample, data set and/or documentation,

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	data sets		monitoring procedures and/or expected outcomes
		4.2	Determine appropriate actions in consultation with supervisor, as necessary
5	Report data and analysis	5.1	Use charts, tables and graphs to present summarised data and analysis results in the required format
		5.2	Verify that entry of data and results are correct
		5.3	Clearly identify summary information and any significant trends and/or problems with data
		5.4	Prepare reports in a format and style consistent with their intended use and enterprise guidelines
		5.5	Communicate results within the specified time and in accordance with enterprise confidentiality and security guidelines.

Required Skills and Knowledge

Required skills
Required skills include: • interpreting data handling procedures, guidelines and manuals • performing laboratory computations • calculating scientific quantities • performing basic statistical analysis • performing graphical analysis • reporting results in the required formats and expected timeframe • storing, retrieving and manipulating data following document traceability procedures • maintaining the security and confidentiality of data in accordance with workplace and regulatory requirements • seeking advice when issues/problems are beyond scope of competence/responsibility
Required knowledge

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Required knowledge includes:

- role of statistics in the interpretation/analysis of environmental data
- relevant terminology, such as variables, dispersion, central tendency, normal distribution, confidence level and replication, inference, causation, association, correlation and hypothesis
- characteristics of a valid measurement and valid sample
- sources and estimates of uncertainty in measurements
- calculations involving evaluation of formulae containing algebraic, power, exponential and/or logarithmic functions, measures of central tendency, sum of squares, variance and standard deviation
- preparation and interpretation on linear and non-linear graphs, and frequency distribution plots
- determination of regression line equations and correlation coefficients
- statistical analysis and significance tests, such as t-test, analysis of variance (ANOVA), chi squared test and data acceptability tests, such as Q, T and Youden
- procedures for data traceability
- procedures for verifying data and rectifying mistakes
- procedures for maintaining and filing records, and maintaining security of data

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • storing, retrieving and manipulating environmental data in accordance with enterprise procedures and traceability requirements • calculating scientific quantities relevant to the work and presenting accurate results in the required format • choosing appropriate graphical/statistical methods to analyse given data sets • preparing frequency distributions for given data, and calculating and interpreting measures of central tendency and dispersion • analysing data to determine relationships between variables and samples

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	• maintaining the security and confidentiality of data in accordance with workplace and regulatory requirements • reporting results in the required formats and expected timeframe.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL924002A Use laboratory application software* • environmental monitoring units, such as the *MSS024000A and MSS025000A series units of competency.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • data sets and records • computer and relevant software or enterprise information system • relevant workplace procedures.
Method of assessment	The following assessment methods are suggested: • review of data worksheets, calculations, computer files (such as spreadsheets and databases), statistical analysis, graphs and/or tables prepared by the candidate • questions to assess understanding of relevant data handling procedures, graphical/statistical methods, trends in data and sources of uncertainty • review of reports prepared by the candidate • feedback from supervisors and peers regarding the candidate's ability to analyse and report data in accordance with enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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	disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, codes, procedures and/or enterprise requirements	**Standards, codes, procedures and/or enterprise requirements may include:** • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS ISO 1000:1998 The international system of units (SI) and its application • Eurachem/CITAC Guide CG4 Quantifying uncertainty in analytical measurement • ISO 5725 Accuracy (trueness and precision) of measurement methods and results • ISO/IEC Guide 98-3:2008 Uncertainty of measurement - Part 3 Guide to the expression of uncertainty in measurement (GUM) • national measurement regulations and guidelines • National Association of Testing Authorities (NATA) technical notes • material safety data sheets (MSDS) • equipment manuals and warranty, supplier catalogues and handbooks • sampling and test procedures and standard operating procedures • enterprise quality manual • validation of the equipment and associated software, where applicable • validation of spreadsheets developed in-house for assay and process calculations

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Data records	Data records may include: • worksheets • spreadsheets or databases linked to information management systems • the results of tests, measurements, analyses and surveys
Laboratory computations	**Laboratory computations may include:** • algebraic, logarithmic, exponential and power functions • calculations involving fractions, decimals, ratios, proportions and percentages • evaluation of formulae containing powers, exponents and logarithms functions • use of scientific notation, correct units and correct number of significant figures • calculation of uncertainties • preparation and interpretation of linear, semi-log and log-log graphs • calculation and interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation • determination of regression line equations and correlation coefficients
Calculations of scientific quantities	**Calculations of scientific quantities may include:** • percentage and absolute uncertainties in measurements and test results • density and salinity • noise (dB and dBA) • dose (mg), dilution(1:10), concentration (molarity, g/mL, mg/L, ppm and ppb) • pH, [H+], [OH-], buffer calculations, Ka, pKa, Kb, pKb and Kw • solubility constants Ks and pKs • radioactive half life, dose, activity and exposure • optical properties, such as absorbance, transmittance, path length, extinction coefficient, concentration (Beers law) and detection limits • electrical properties, such as conductivity and resistivity
Graphical analysis	Graphical analysis may include: • determination of linear, logarithmic, exponential and

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	power relationships • regression lines and interpretation of correlation coefficients • preparing frequency distributions for given data • calculating and interpreting measures of central tendency and dispersion
Calculations	Calculations may be performed: • with or without a calculator • with computer software, such as: • spreadsheets • databases • statistical packages
Statistical analysis	Statistical analysis may include the use of: • histograms, frequency plots, stem and leaf plots, box plots and scatter plots • probability and normal probability plots • regression methods for calibration, linearity checks and comparing analytical methods • Pearson's product moment correlation coefficient • chi squared tests • ANOVA • data acceptability tests, such as Q, t and Youden
Records	Records may include information associated with: • purchase of equipment and materials • service records • safety procedures • history of calibration and test results • management of data sets
Occupational health and safety (OHS) and environmental management requirements	**OHS and environmental management requirements:** • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of

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	Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025004A Provide environmental information to customers

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to respond to internal and external requests for information about enterprise environmental management plans, policies, procedures and/or environmental data. Personnel are required to gather information, such as environmental management requirements for specific work activities, revised plans/procedures, sampling or monitoring data, test results and trend analysis, and supply it to customers in accordance with enterprise procedures.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, odour, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation/rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Receive and assess the request for environmental information	1.1	Confirm and record the source, nature and priority of the customer's request
		1.2	Redirect the request to a more relevant person, if appropriate
		1.3	Check authority/approval to release information by referring to enterprise procedures or relevant personnel
2	Prepare the response	2.1	Identify sources and/or locations of required information
		2.2	Resolve any problems with accessing information in consultation with supervisor
		2.3	Extract and copy the required information
		2.4	Check that the information is accurate, complete and reliable and conforms with enterprise requirements
		2.5	Address any information gaps or deficiencies by sourcing additional information or obtaining inputs from relevant personnel
		2.6	Keep the customer informed of progress when it is not possible to answer their request within the agreed timeframe
3	Provide environmental information	3.1	Prepare correspondence or report using clear, concise language and in the specified format
		3.2	Check/revise text to ensure that the intended meaning is not ambiguous
		3.3	Check spelling, punctuation and grammar and correct any errors

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		3.4	Use the most appropriate communication method given the priority, cost and confidentiality involved and the customer's facilities
		3.5	Check that the information supplied meets the customer's needs and, if not, take appropriate action
4	Record details of request and response	4.1	Record all details of the request and information supplied n accordance with enterprise procedures
		4.2	Notify other relevant personnel of request and response in accordance with enterprise procedures
		4.3	File/store records in the designated place in accordance with enterprise procedures

Required Skills and Knowledge

Required skills
Required skills include: • applying enterprise procedures for the receipt of information requests, release of information and record keeping • analysing and prioritising requests for information • locating and organising relevant information from a range of sources • providing information that is accurate, clear, unambiguous and meets the client's needs • preparing written documents that are free from spelling, grammatical and formatting errors • seeking advice when requests for information are unclear or are beyond scope of competence/responsibility • listening actively and asking questions to clarify a client's understanding • maintaining security and confidentiality of information in accordance with enterprise procedures • maintaining records
Required knowledge
Required knowledge includes: • common sources of environmental information

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- environmental protection/management terminology, concepts and principles
- site/project/program characteristics and the nature of activities
- environmental legislative/regulatory requirements relevant to site/project/program within scope of responsibility
- enterprise environmental management plans, procedures, control measures and management actions for site/project/program within scope of responsibility
- environmental management values, environmental issues, risks and impacts for site/project/program
- enterprise procedures for the receipt of information requests, release of information and record keeping

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered by this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • following enterprise procedures for providing environmental information to customers • locating and supplying accurate, reliable information that meets the customer's needs • providing authorised information using language, style and format that is readily understood • communicating information within the expected timeframe and confirming the client's understanding.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025003A Report environmental data* • environmental monitoring units, such as the *MSS024000A and MSS025000A series units of competency.* The competencies covered by this unit would be

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	demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, strategies, procedures and checklists • access to a computer, internet, data sets, enterprise information management system and reports.
Method of assessment	The following assessment methods are suggested: • review of environmental information provided by the candidate to a range of customers • feedback from supervisor and customers that the candidate consistently provides timely information which meets their needs • oral/written tests involving environmental management terms, principles, legislative/regulatory requirements, enterprise environmental management plans, policies and procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes,	**Legislation, standards, codes, procedures and/or**

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policies, strategies, procedures and/or enterprise requirements	**enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • national strategies, such as: • National Water Quality Management Strategy • National Strategy for Ecologically Sustainable Development • National Greenhouse Strategy • environmental management plans, and site information about applicable legislative requirements and approval requirements • information about site processes and work schedules • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soil) • job hazard analyses, safe work procedures, work method statements and material safety data sheets (MSDS) • enterprise procedures for the receipt of requests for information and release of information data and results • enterprise procedures for the confidentiality and

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	security of enterprise information
Environmental information	Environmental information may include: • details of legislation, regulations, guidelines, standards, codes of practice, licence conditions, approvals and permits • enterprise environmental management plans, policies, strategies, procedures, required actions • site/project initial advice statements and risk/impact assessments • records of site consultations with interested parties • site/project environmental reports (e.g. weekly/monthly monitoring of air, water and noise) • flora and fauna survey results • environmental data sets, such as • satellite imagery and remote sensing data • geophysical, geochemical, geological, hydrological and meteorological data • ecological data, such as distribution of vegetation, fauna and pests • social science data, such as demographic and census information • land use data, zoning and property classifications • historical records and photographs • enterprise information about sites/projects/programs for stakeholders and interested parties • entries for enterprise website • cost, quantities and time estimation • contractual variations and claims • notification of environmental issues and problems • internal environmental audit/inspection findings • environmental training records
Customers	Customers may include: • internal customers, such as site environmental officer, environmental manager, construction manager, operations manager and project manager • external customers, such as regulatory authorities, government departments, suppliers, contractors, consulting engineers, scientists, planners and community groups
Sources of information	Sources of information may include: • enterprise intranet/information management system • contractors providing environmental services

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	• government departments and agencies (e.g. environment, climate change, agriculture and mining) • regulatory authorities • utility authorities/companies (e.g. water, gas and electricity) • land title office and Valuer General • local government records • Geoscience Australia • Australian Social Science Data Archive • internet, library/archive collections, annual reports and community newsletters • media reports (e.g. TV, video, audio and photographs)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025005A Produce site maps

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to map the environmental features of a site using sketch maps, computer rendered graphics or geographic information systems (GIS) software. Personnel identify sources of existing environmental data and assess its availability/suitability, collect field data as necessary, assess data quality and format, and present data and incorporate it onto maps. Producing maps to display environmental data requires knowledge of environmental management processes, relevant legislative and regulatory requirements, mapping principles, and the use of mapping software and hardware. Personnel will require additional units of competency to manage spatial data sets or undertake complex modelling, data manipulation and analysis using GIS.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, odour, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- management of contaminated sites
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024005A Collect spatial and discrete environmental data

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Source and assess existing site information and data	1.1	Confirm the client's information needs, timeframe and site map specifications
		1.2	Locate and obtain existing enterprise site information and review its relevance and accuracy
		1.3	Locate external sources of relevant data sets and assess their availability, value and limitations
		1.4	Confirm ownership, access arrangements and price of required data sets
		1.5	Obtain selected data sets in accordance with enterprise procedures
		1.6	Build a detailed description of the site using existing information and data and identify any gaps
2	Collect field data about the site	2.1	Establish information needs and identify appropriate field techniques
		2.2	Confirm details of field work, site permits/access restrictions and legislative/regulatory requirements with supervisor, as necessary
		2.3	Confirm data format and quality requirements
		2.4	Assemble required field equipment and supplies and check that all items are fit for purpose
		2.5	Ensure that all required equipment and supplies are transported safely to and from the site

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		2.6	Take sufficient and accurate measurements of the site and its features to ensure data reliability
3	Prepare data and supporting information	3.1	Assess the integrity of all data to ensure its suitability
		3.2	Recognise and resolve any disparities between data sets
		3.3	Identify compatible formats for data
		3.4	Select data to meet client needs
		3.5	Assemble relevant data elements
		3.6	Ensure data format meets client needs
		3.7	Prepare supporting information using media and format that meet client needs
4	Produce maps to meet information needs	4.1	Transfer data accurately from data sources into GIS or similar systems
		4.2	Prepare sketch and/or computer generated maps to the required quality standard and within the expected timeframe
		4.3	Ensure that all required site features and standard map elements are included in accordance with standard cartographic design principles
		4.4	Compare map against site features to ‘ground-truth’ information, as necessary
		4.5	Seek feedback from users regarding the utility of maps/data and resolve any problems
		4.6	Analyse feedback to identify opportunities to improve the quality of maps

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Required Skills and Knowledge

Required skills
Required skills include: • locating, interpreting and assessing existing maps, data sets and environmental information • communicating effectively with suppliers of data and map users • planning and preparing for field work • collecting and recording spatial and environmental data in the field • scaling information and plotting data • preparing hand drawn or computer rendered maps • using computers and software to manipulate and present data in graphs, tables, diagrams and maps • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely
Required knowledge
Required knowledge includes: • environmental terms, concepts and principles relevant to data sets and maps • types and functions of maps, charts, aerial photos and their advantages/disadvantages • map conventions, symbols and representation of topographical features on maps and plans • mapping principles, including layout, legend, scale, media, printing and presentation styles • use of software and hardware, such as printers and plotters • functional components of a compass/global positioning system (GPS) and factors affecting compass/GPS accuracy • techniques for estimating distance and taking bearings • relevant legislation, regulations, licences and permit requirements for site • enterprise environmental management framework of policy, procedures and management plans for site • relevant health and safety requirements and enterprise safe work procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in

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competency in this unit	this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • sourcing existing environmental information and data sets that meet quality requirements • collecting reliable spatial and environmental data at the site • using available data to produce maps that meet the client's specifications and timeframe • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024003A Apply an understanding of environmental principles to a site.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history, maps and aerial photos • guidelines, codes, regulations, and enterprise procedures governing data collection • relevant field equipment, GPS receivers and related GPS software • relevant computer software and hardware.
Method of assessment	The following assessment methods are suggested: • review of maps produced by the candidate • feedback from clients, supervisors and peers about the candidate's ability to source, assess and use existing data sets to produce maps • observation of candidate collecting field data with a focus on: • general site reconnaissance and observations • set-up and use of equipment • accurate data recording • problem solving/troubleshooting • safe work practices • oral and/or written questions to assess underpinning knowledge of mapping principles.

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	In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as:

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	• AS/NZS ISO 14000 Set:2005 Environmental management standards set • enterprise or regulator procedures for sampling, monitoring and in-field testing • material safety data sheets (MSDS) • enterprise environmental management plans for sites and projects • safe work procedures
Maps	Maps may include: • topographic • land use and land title maps • vegetation, soils and regional ecosystem maps • air photos • satellite imagery • thematic maps produced using GIS software, such as Mapinfo and Arcview
Environmental features of sites	Environmental features of sites may include: • hills, mountains, plains and cliffs • waterways, dams, lakes, oceans, estuaries and deltas • vegetation and fauna • soil and rock types • buildings, such as houses, schools, police stations, hospitals, churches, factories and industrial plants • roads, railways, tracks, jetties, piers and other infrastructure • utility services • property boundaries, shire boundaries and electoral boundaries • mining leases, local catchment areas and nature reserves • population and demographics
Enterprise site information	Enterprise site information may include: • site or project history • client history • records of consultations with stakeholders • site access protocols and permits • site utilities/services (e.g. water, sewer, electricity and gas) • maps (e.g. road, topographical and survey marks) • existing data sets (e.g. vegetation, topography, soils and regional ecosystem maps)

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	• hazards and safety risks
External sources of data	External sources of data may include: • government departments and agencies (e.g. environment, climate change, agriculture and mining) • utility authorities/companies (e.g. water, gas and electricity) • land title office and Valuer General • local government records • Geoscience Australia • Australian Social Science Data Archive • companies providing environmental services
Data sets	Data sets may include: • textual, graphical, spatial and temporal in hard/soft copy • satellite imagery and remote sensing data • geophysical, geochemical, geological, hydrological and meteorological data • ecological data, such as distribution of vegetation, fauna and pests • social science data, such as demographic and census information • land use data, zoning and property classifications • historical records and photographs
Field techniques	Field techniques may include: • on site surveying • hand mapping • comparing site features with existing site information • collection of samples and field measurements
Field equipment and supplies	Field equipment and supplies may include: • GPS • tapes and pegs • compass • clinometer • portable computer, palm pilot or data logger • communication equipment
Standard map elements	Standard map elements may include: • latitude and longitude • grid reference systems (old and new and their relation to one another)

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	• north point, elevation, scale and legend
Integrity of data	Integrity of data may include: • accuracy, currency and completeness • scale and resolution • confidence limits for data • quality (e.g. age/condition of hard copy documents)
Disparities between data sets	Disparities between data sets may involve: • datum and projection • currency
Supporting information	Supporting information may include: • graphs, tables, equations and parameters • explanatory notes
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025006A Collect and evaluate groundwater data

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to obtain, preserve and transport representative samples of groundwater for laboratory analysis; measure bore conditions and test chemical, physical parameters in the field; and to process data and interpret results. Personnel usually work within an existing sampling or monitoring plan, continually monitor levels of risk and use specified safe working procedures and equipment. They are also required to work closely with drillers during the construction of wells and bores to prevent contamination of samples, obtain logs and manage waste. Note: This unit does not cover laboratory-based analysis of groundwater which is addressed in *MSL974003A Perform chemical tests and procedures* and *MSS025012A Perform environmental microbiological tests.*

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water, soil and noise)
- environmental compliance, auditing and inspection
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- solid and hazardous waste management
- management of contaminated sites
- site remediation or rehabilitation
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm groundwater data requirements with supervisor	1.1	Confirm the scope and purpose of sampling/monitoring data requirements
		1.2	Review available site information, such as site plan, bore locations, construction and history of sampling/monitoring
		1.3	Confirm the sampling methods, locations, numbers and types of samples, and duration/frequency of sampling from enterprise or client's sampling plan
		1.4	Check that all sampling/testing procedures are in accordance with client or enterprise requirements, relevant standards and guidelines
2	Prepare for groundwater sampling and monitoring	2.1	Identify site and sampling hazards and review enterprise safety procedures
		2.2	Liaise with relevant personnel to arrange site access and obtain all clearances and/or permits, as necessary
		2.3	Review field sampling procedures and sample preparation methods required for specific laboratory analyses
		2.4	Select purging/sampling equipment and sampling conditions to achieve representative samples and preserve sample integrity during collection, storage and transit
		2.5	Ensure all reagents, solutions, standards and blanks (as appropriate) are obtained and/or prepared ready for field use

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		2.6	Select field test equipment/instruments and check operation and calibration as required in accordance with methods/procedures and manufacturer instructions
		2.7	Assemble and stow all sampling equipment, field test equipment, materials, containers and safety equipment
		2.8	Arrange suitable transport to, from and around site as required
3	Liaise with drillers during establishment of wells and bores	3.1	Confirm location of well or bore and groundwater monitoring requirements using site sampling and monitoring plan
		3.2	Examine the drilling/construction area to identify possible hazards
		3.3	Ensure proposed drilling/construction method will not cause contamination and that casing, drilling fluids and any other materials used in the bore are free of contaminants
		3.4	Ensure drilling and sampling equipment is cleaned thoroughly before drilling commences
		3.5	Ensure protective casings and screens are kept in their protective coverings prior to installation
		3.6	Monitor drilling to accurately log samples as required and prevent their contamination
4	Conduct representative sampling of groundwater	4.1	Locate sampling locations and services at the site and identify possible hazards
		4.2	Conduct sufficient measurements to accurately determine water level and bore depth, as required
		4.3	Record bore/environmental conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity
		4.4	Conduct purging in accordance with defined procedure or method, collect the waste and

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			decontaminate the equipment used
		4.5	Collect required representative samples and ensure all controls, blanks and replicate samples are properly integrated into the sampling process
		4.6	Record all information and label samples in accordance with chain of custody/traceability requirements
		4.7	Filter and prepare samples to preserve their integrity for subsequent analysis
		4.8	Secure and transport all samples back to base in accordance with enterprise procedures and relevant guidelines
5	Conduct field testing of groundwater	5.1	Assemble required monitoring instruments, equipment, and reagents and conduct pre-use checks in accordance with manufacturer instructions
		5.2	Retrieve samples for designated field tests or locate established locations for in-situ testing
		5.3	Set up, calibrate and operate equipment/instruments in accordance with test methods/procedures and manufacturer instructions
		5.4	Take sufficient measurements of groundwater field parameters to obtain reliable data and in accordance with specified methods/procedures
		5.5	Record all field observations/data and ensure that they are accurately transferred to enterprise information database
6	Process and interpret groundwater data	6.1	Review test data noting atypical observations
		6.2	Ensure calculated values are consistent with expectations
		6.3	Estimate and document uncertainty of measurements in accordance with enterprise procedures, if required

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		6.4	Record and report processed results in accordance with enterprise procedures
		6.5	Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel
		6.6	Determine if obvious procedure or equipment problems have led to atypical data or results
		6.7	Compare results with established groundwater quality standards, statutory environmental quality concentration limits or similar, if relevant
		6.8	Finalise reporting of results in accordance with enterprise requirements
7	Maintain a safe work environment	7.1	Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
		7.2	Rehabilitate sampling site to render it safe and to minimise environmental impact
		7.3	Clean/decontaminate all equipment, containers, work area and vehicles according to enterprise procedures
		7.4	Check serviceability of all equipment before storage
		7.5	Minimise the generation of wastes and environment impacts
		7.6	Liaise with relevant personnel for the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

Required skills

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Required skills include:

- planning and preparing for field activities
- observational and descriptive skills
- communicating effectively with site personnel, drillers and supervisors
- applying field sampling and monitoring procedures, including pre-treatment, containers, preservation, storage, labelling and traceability
- demonstrating correct and safe use, of field instruments and/or equipment, including field calibration
- identifying and rectifying basic instrument faults
- collecting representative samples in accordance with a sampling plan
- preserving the integrity of samples
- identifying atypical sampling conditions and samples and taking appropriate action
- cleaning, decontaminating and maintaining purging/sampling equipment
- completing sampling records and writing/compiling concise and accurate reports
- seeking advice when issues/problems are beyond scope of competence/responsibility
- following requirements for the disposal of waste and the preservation of the environment
- working safely

Required knowledge

Required knowledge includes:

- terminology used to describe aquifers, drilling/construction of wells and bores, and groundwater sampling/testing procedures
- principles of representative sampling and field testing of common groundwater parameters
- preservation of the integrity of samples
- maintaining identification of samples relative to their source, enterprise and/or legal traceability requirements
- typical values of groundwater parameters, common pollutants/contaminants
- links between quality control, quality assurance, quality management systems and sampling procedures
- enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods
- links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • interpreting and applying groundwater sampling/ monitoring plans and procedures for site • recognising site hazards and applying safe work procedures during sampling, testing and transport • providing advice to drillers about environmental requirements • obtaining reliable, representative samples of groundwater • demonstrating correct and safe use and calibration of field instruments and/or equipment • measuring bore conditions and conducting field tests of groundwater parameters to obtain reliable data • calculating results using appropriate units/precision • identifying atypical results as out-of-normal range or an artefact • providing accurate, complete records of sampling and field testing • working safely and following relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025014A Perform sampling and testing of contaminated sites.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • vehicles, sampling equipment, field test equipment, digital camera, containers, reagents, consumables and

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	manuals • enterprise procedures, test methods, maps, site plans and site sampling/monitoring plans • safety equipment.
Method of assessment	The following assessment methods are suggested: • inspection of groundwater samples collected by the candidate • review of groundwater measurements, test results, calculations and site observations produced by the candidate • review of sampling/testing records completed by the candidate • feedback from peers and supervisors about the candidate's ability to consistently apply enterprise procedures and work safely • oral and written questioning to check underpinning knowledge of groundwater parameters, sampling/test procedures and calculations. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise	Legislation, standards, codes, procedures and/or enterprise requirements may include:

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requirements	• federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • water and water management • pollution and contaminated sites • Australian and international standards and guidelines, such as: • AS/NZS ISO 14000 Basic set:2007 Environmental management basic set • AS/NZS 5667 series: Water quality - Part 11 Guidance on sampling of groundwaters • Geoscience Australia, Groundwater sampling and analysis - A field guide • Australian drinking water guidelines • Australian and New Zealand Guidelines for fresh and marine water quality • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. sustainable development and impact assessment) • material safety data sheets (MSDS) • OHS national standards and codes of practice • site-specific requirements
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Sampling/monitoring plans	Sampling and monitoring plans may include: • purpose, such as: • identification of aquifers, leakage and hydraulic connection of aquifers • assessment of groundwater movement, flow,

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	recharge and discharge, and quality • assessment of salt, nutrients, pesticides and other contaminants • sampling criteria, such as: • spatial and depth distribution within target • depth to water level for shallow/deep aquifers • contamination potential and land use • nature of recharge/discharge mechanisms • diversity of groundwater use • bore accessibility and bore equipment availability • sampling frequency/duration depending on purpose, such as level, quality indicators (e.g. temperature and electrical conductivity), long-term quality parameters and could be continuous, hourly, daily, monthly, quarterly, six monthly, annual and long term
Site and sampling hazards	Site and sampling hazards may include: • risk of surface collapse around old wells • unsafe stages and ladders • working in confined spaces, such as wells, boreholes, wellheads and basements • exposure to contaminated groundwater and confined space atmospheres • solar radiation, dust and noise • handling bulky or heavy equipment
Safe working procedures	Safe working procedures may include: • use of safety harness, suitable clothing and boots, sunglasses, hat and gloves • use of breathing apparatus • ensuring two persons are present during sampling of wells (one at the surface) • testing of atmosphere for oxygen deficiency and flammable/toxic vapours • working upwind of known contaminants • prohibition of eating, drinking and smoking • separation of heavy equipment into smaller units/cases for transport • location and avoidance of site utility services • securing and counterbalancing of pumps and water filled hoses down the hole • testing and earthing of electrical generators, trip out devices and connectors (especially at waterlogged sites)

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	• shielding of hot surfaces and exhausts • careful handling of glass containers and preservatives • regular medical checks
Drilling and construction of wells and bores	Drilling and construction of bores and wells may include: • drilling techniques, such as auger, rotary air, rotary mud, cable tool, direct push technologies, sonic drilling and vibro coring • bore construction techniques, such as: • use of PVC, stainless steel and fibreglass casings • mechanical casing joints • screen and gravel packs • cement or bentonite seals, • lockable caps, bore name and ID label • piezometer construction techniques, such as: • shallow piezometers • bundled mini piezometers
Purging and field sampling equipment	Purging and field sampling equipment will vary according to the position of the sampler intake, purge criteria used and composition of the groundwater to be sampled, and may include: • Teflon, glass and stainless steel items • bailers and cords, and syringe devices • air-lift, suction-lift, gas operated, bladder, submersible, inertial (foot pump) and submersible piston pumps • inlet screens • flow meter water sampler • groundsheets, scrubbing brushes, hoses, buckets, jerry cans and waste containers • cables, batteries, generator and air compressor • tripods, stands, swivelling blocks and tools • eskies and ice • first aid equipment, sunscreen, drinking water and mobile phone
Sample preparation and transport	Sample preparation and transport may include: • filtering groundwater samples using syringes, filter capsules and hand operated pumps • sample preparation for major and minor chemistry, nutrients and isotope analysis • sampling and filtration for incubated microbiology samples • collecting samples of dissolved and entrained or

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	evolving gases • labelling and packing of samples to ensure integrity, traceability, preservation and prevention of cross-contamination during transit • sample delivery within specified holding times
Field testing equipment and instruments	Field testing equipment and instruments may include: • maps, global positioning system (GPS), two-way radio and mobile phone • tape measures and weights, plopper/samplers and water level meters • flow cells • parameter specific meter or multi-probes, such as dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature • field test kits for parameters such as dissolved gases, chemical anions and cations, heavy metals, E. coli and biological oxygen demand (BOD) • portable colourimeters and field microscopes • portable gas analyser for CH_4, O_2, CO_2, CO and H_2S • sterile sample bottles and other sample containers specific to analytical method • reagents, calibration solutions and cleaning solutions • media/substrates for presence or absence microbiology field tests • filters and sieves • data loggers and digital camera • equipment manuals and sampling/testing procedures
Field measurements/tests	Field measurements/tests may include: • measuring depth of bores and water levels • pH and temperature • electrical conductivity • dissolved oxygen • redox potential • alkalinity using burette titration and alkalinity titrator • presence or absence microbiology field tests • field gas analysis for CH_4,O_2, CO_2, CO and H_2S
Field observations and data	Field observations and data may include: • sampling point name, location, time, date and type • nature of aquifer and water bearing strata • well/bore dimensions and description of conditions • pumping status, depth of pump suction and/or

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	discharge • water level within well or borehole • method of sampling and depth of sampling • sample appearance when collected (colour, clarity and odour) • results of on-site analysis (e.g. pH, electrical conductivity and dissolved oxygen) • details of sample preservation techniques used • details of on-site filtration (e.g. filter pore size) • details of sample storage method required/used • name of sample collector
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025007A Perform sampling and testing of soils

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to obtain soil samples in accordance with a defined sampling plan, prepare the samples for testing, conduct in-field and laboratory testing of the samples and report the results. Personnel are required to check the validity and reliability of data, recognise atypical test data, and troubleshoot common test procedures and equipment problems.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water and soil)
- environmental compliance, auditing and inspection
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- solid and hazardous waste management
- management of contaminated sites
- site remediation or rehabilitation
- geotechnical services and civil engineering
- natural resource management.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024008A Recognise common geological landforms and samples

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm soil sampling and testing requirements with supervisor	1.1	Review available site information, such as site plan, sampling/testing locations and history of sampling/testing
		1.2	Confirm the sampling locations, numbers and types of samples, timing and frequency of sampling from enterprise or client's sampling plan
		1.3	Check that all sampling/testing procedures are in accordance with client or enterprise requirements, relevant standards and guidelines
2	Prepare for soil sampling	2.1	Identify site and sampling hazards and review enterprise safety procedures
		2.2	Liaise with relevant personnel to arrange site access and obtain all clearances and/or permits, as necessary
		2.3	Select sampling equipment and conditions to achieve representative samples and to preserve sample integrity during collection, storage and transit
		2.4	Select field test equipment/instruments and check operation and calibration, as required, in accordance with procedures and manufacturer instructions
		2.5	Assemble and check all sampling equipment, field test equipment, materials, containers and safety equipment
		2.6	Arrange suitable transport to, from and around site, as required
3	Conduct sampling and log soil	3.1	Locate sampling points and any services at the site

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	samples	3.2	Work effectively with other site personnel during drilling and excavation operations to collect and log reliable samples, as necessary
		3.3	Conduct representative sampling in accordance with sampling plan and defined procedures for field and/or laboratory testing, as required
		3.4	Record all information and label samples in accordance with traceability requirements
		3.5	Record environment and any conditions or atypical observations made during sampling that may impact on sample representativeness or integrity
		3.6	Transport all samples back to base according to enterprise procedures and relevant codes
4	Prepare soil samples for testing	4.1	Prepare sub-samples and back-up sub-samples that are representative of the source
		4.2	Label all sub-samples to ensure traceability and store in accordance with enterprise procedures
		4.3	Follow defined preparation and safety procedures to limit hazards or contamination to samples, self, work area and environment
		4.4	Distribute sub-samples to required destinations for testing, maintaining sample integrity, traceability and chain of custody requirements
5	Conduct physical and chemical soil tests in the field	5.1	Obtain sample or subsample for designated field test
		5.2	Check that all equipment, instruments and reagents are fit for purpose
		5.3	Set up and calibrate instruments, as necessary, to ensure safe operation and valid results
		5.4	Operate equipment/instruments in accordance with test method requirements

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		5.5	Perform tests/procedures/observations on all samples and standards, if appropriate, in accordance with specified methods
		5.6	Record all field observations and results and ensure that they are accurately transferred to enterprise information management system
6	Conduct physical and chemical soil tests in the laboratory	6.1	Obtain sample or subsample for designated laboratory test
		6.2	Check that all equipment, instruments and reagents are fit for purpose
		6.3	Set up and calibrate instruments, as necessary, to ensure safe operation and valid results
		6.4	Operate equipment/instruments in accordance with test method requirements
		6.5	Perform tests/procedures on all samples, blanks and standards, if appropriate, in accordance with specified methods
		6.6	Record test data noting atypical observations
		6.7	Process the data for samples, standards and blanks in accordance with enterprise procedures
		6.8	Enter approved information into enterprise information management system
7	Review results and assess soil suitability for specific purposes	7.1	Review results in relation to legislative and/or client requirements
		7.2	Compare data with required/established/desired parameters to establish suitability for purpose
		7.3	Determine need for remedial action and report to client
8	Maintain a safe work environment	8.1	Rehabilitate sampling site to render it safe and to minimise environmental impact

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8.2 Clean all equipment, containers, work area and vehicles according to enterprise procedures

8.3 Check serviceability of all equipment before storage

8.4 Use defined safe work practices and personal protective equipment to ensure personal safety and that of others

8.5 Minimise the generation of wastes and environment impacts

8.6 Ensure the safe collection of all hazardous wastes for appropriate disposal.

Required Skills and Knowledge

Required skills
Required skills include: • planning and preparing for field and laboratory activities • site observational and descriptive skills • researching and summarising existing data and reports • communicating effectively and writing/compiling concise and accurate reports • field sampling and monitoring procedures, including labelling and traceability • demonstrating correct and safe use of field instruments and/or equipment under laboratory and field conditions, including field calibration • identifying and rectifying basic instrument faults • collecting representative samples in accordance with a sampling plan • using appropriate techniques to preserve the integrity of samples • identifying atypical materials and samples and taking appropriate action • maintaining sampling equipment • completing sampling records • seeking advice when issues/problems are beyond scope of competence/responsibility • following requirements for the disposal of waste and the preservation of the environment • working safely
Required knowledge
Required knowledge includes:

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- appropriate scientific terminology for soils and soil science
- soil classifications
- fundamentals of soil science, including:
- soil morphology
- mineralogy
- physical, chemical and biological properties
- soil formation processes
- soil function within ecosystems
- land use and soil systems (interactions and impacts)
- principles of representative samples
- principles and procedures for random, systematic and stratified sampling, and consistency of sampling procedures
- preservation of the integrity of samples
- maintaining identification of samples relative to their source, enterprise and/or legal traceability requirements
- cost-effectiveness of sampling
- characteristics of soils to be sampled and likely contaminants
- links between quality control, quality assurance, quality management systems and sampling procedures
- enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods
- links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • collecting and preserving sufficient representative soil samples to enable all processing and testing to occur and storage of back-up samples • identifying atypical materials and samples and taking appropriate action • labelling samples and sub-samples to satisfy

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	enterprise/legal traceability requirements • applying sampling and test methods/procedures to accurately prepare and test samples • safely operating and maintaining sampling equipment and test instruments to enterprise standards and/or manufacturer specification • interpreting gross features of data, and identifying atypical results as out-of-normal range or an artefact • preparing calibration graphs and calculating results using appropriate units and precision • making valid conclusions about soil suitability • reporting results and completing sampling records using enterprise procedures • working safely and following relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL974003A Perform chemical tests and procedures* • *MSS025006A Collect and evaluate groundwater data* • *MSS025014A Perform sampling and testing of contaminated sites.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • variety of sample types • sampling plans • sampling containers and sampling equipment • equipment/instruments for in-field and laboratory soils testing.
Method of assessment	The following assessment methods are suggested: • inspection of soil samples collected by the candidate • review of sampling/testing documentation completed by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, sampling/testing procedures and works safely • questioning to assess underpinning knowledge of soil

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	sampling, soil testing equipment and methods • observation of the candidate collecting and testing a range of soil samples. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • soil conservation • pollution and contaminated sites • Australian and international standards, such as: • Standards Australia HB 160 Soils testing • AS 1289 series Methods of testing of soils for engineering purposes • AS 1726:1993 Geotechnical site investigations

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	• AS 1199 series Sampling procedures for inspection by attributes • AS 1678 series Emergency procedure guide -Transport • AS 4433.2:1997 Guide to the sampling of particulate materials - Preparation of samples • enterprise and/or client sampling schemes and sampling plans • enterprise recording and reporting procedures • material safety data sheets (MSDS) • methods and procedures which may be written to meet enterprise, client and/or regulatory/certifying body requirements • site plans, maps and specifications
Fundamentals of soil science	Fundamentals of soil science include: • soil morphology: • soil profiles and soil horizons • soil structure and texture • mineralogy • (Australian) soil classification: • order and suborder • great group, subgroup and family • pedology and soil formation: • pedogenesis • pedosphere • Climate, Organisms, Relief, Parent Material or Lithography, Time (CLORPT) • edaphology: • plant-soil interactions • agricultural soil science (soil fertility) • environmental soil science (soil contamination and remediation) • geomorphology: • erosion and mass wasting • transportation and deposition (sedimentation) • fluvial, aeolian, hillslope and weathering processes • soil chemistry: • soil solids (composition and structure) • solid (solution equilibria) • acid-base equilibria (acid sulfate soils) • oxidation-reduction equilibria • anion and cation exchange

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	• soil salinity • complexiometric equilibria • sorption phenomena on soils • physical/engineering soil properties: • colour (Munsell chart) • liquid and plastic limits • linear shrinkage • soil particle density • particle size distribution • dispersion and Emerson class number
Basic principles of sampling	Basic principles of sampling include: • sampling plans and site selection • representative samples • preservation of integrity of samples • maintaining identification of samples relative to their source, enterprise and legal traceability • cost-effectiveness of sampling • consistency of sampling procedures • sampling principles, including random, systematic stratified and composite sampling
Materials sampled	Materials sampled may include: • solid samples, such as soil and sediments • natural, agricultural and engineered soils • solid wastes • soil water • soil gas/vapour
Types of samples	Types of samples may include: • discrete samples • composite samples • quality control samples • research or one-off samples • environmental or survey samples
Sampling tools and equipment	Sampling tools and equipment may include: • maps, global positioning system (GPS) unit and compass • shovels and crow bars • metal-free scoop and cleaning brush • folding rulers and tape measures • hand and power augers • pry bars and files (auger maintenance)

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	• push tubes • sampling tubes, dip tubes, spears and syringes • front-end loader, backhoe, excavator and drill rig • sample bottles or containers, plastic bags/containers and disposable buckets • lysimeters • soil gas probes • sample splitters • graters and mills • mortar and pestles
Testing equipment and instruments	Testing equipment and instruments may include: • sieves and sieve shakers • digital camera • hand lenses and microscopes • Munsell colour chart • pH meter and soil pH test kit • conductivity meter • tensiometer (moisture measurements) • ultraviolet/visible (UV/Vis) spectrophotometer • atomic absorption spectrophotometer • gas chromatographs (GC) and GC-MS • infrared spectrophotometer • diffuse reflectance accessories • inductively coupled plasma (ICP) spectrometers and ICP-MS • X-ray fluorescence (XRF) spectrometers • radiation monitor (e.g. Geiger-Muller counter) • drying ovens • balances • laboratory glassware
Site and sampling hazards	Site and sampling hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as microorganisms and agents associated with soil • chemicals, such as acids and hydrocarbons • aerosols • sharps and broken glassware • manual handling of heavy sample bags and containers

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	• crushing, entanglement and cuts associated with moving machinery and hand tools • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • use of MSDS • use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of biohazard containers and laminar flow cabinets • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating equipment and work areas • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lock-out and tag-out procedures
Chemical soil tests	Chemical soil tests may include: • electrical conductivity • pH • alkalinity • cation exchange capacity • organic carbon • available phosphorus • nutrients and micronutrients • sulfate • carbonate • nitrate and total nitrogen • metals, including heavy metals • organics, including pesticides and other hazardous chemicals
Physical soil tests	Physical soil tests may include: • soil profile description • soil colour (Munsell) • soil texture • soil resistivity

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	• liquid limit • plastic limit (plasticity index) • Atterberg limits • standard penetration test • cone penetration test • soil moisture content • compaction • infiltration • volume expansion • linear shrinkage • particle size analysis • dispersibility (Emerson class number) • water repellence • radioactivity
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025008A Monitor and evaluate noise

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to monitor noise using handheld sound level meters and fixed sound monitoring stations with either data logging or telemetry. It includes the ability to perform noise surveys, process data and report results in accordance with enterprise standards.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. monitoring of environmental and/or occupational noise)
- environmental compliance, auditing and inspection
- environmental management
- occupational hygiene.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm noise	1.1	Confirm the purpose for noise monitoring with

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	monitoring requirements		supervisor
		1.2	Confirm locations, timing and frequency of monitoring from enterprise or client's monitoring plan or other instructions
		1.3	Check that all noise measurement procedures are in accordance with client or enterprise requirements, relevant standards and codes
2	Prepare for noise measurement	2.1	Identify site hazards and review enterprise safety procedures
		2.2	Liaise with relevant personnel to arrange site access and obtain all clearances and/or permits, as necessary
		2.3	Select noise monitoring instruments and any ancillary equipment that are required for the particular task
		2.4	Assemble all field test equipment and complete all pre-use and calibration checks in accordance with enterprise procedures and manufacturer instructions
		2.5	Stow all equipment for safe and secure transport
		2.6	Arrange suitable transport to, from and around site, as required
3	Perform noise measurement	3.1	Record significant site features, such as noise sources, their direction and approximate distance, relevant barriers, structures, noise sensitive areas and adjacent land uses
		3.2	Select and record sampling sites and ensure that site conditions are conducive for valid and reliable noise measurement
		3.3	Measure and record relevant site condition parameters and make any modifications to procedures as appropriate
		3.4	Check calibration of sound level meter and make any required adjustments and record results

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		3.5	Conduct noise measurements in accordance with enterprise, regulatory and manufacturer procedures
		3.6	Ensure that background measurements are obtained at an appropriate time, under appropriate conditions and in accordance with enterprise/regulatory procedures
		3.7	Repeat and record calibration measurements at the conclusion of the measurement sequence in accordance with enterprise/regulatory procedures
		3.8	Collect and/or record all results and ensure that they are accurately transferred to enterprise information database
4	Process and interpret noise data	4.1	Review test data noting atypical observations
		4.2	Manipulate raw data to obtain corrected and adjusted data and ensure that calculated values are consistent with expectations
		4.3	Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required
		4.4	Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel
		4.5	Determine if obvious procedure or equipment problems have led to atypical data or results
		4.6	Compare results with established noise standards, statutory noise limits or similar, if relevant
		4.7	Record and report data and results in accordance with enterprise requirement
5	Maintain a safe work environment	5.1	Use established safe work practices and personal protective equipment to ensure personal safety and that of other personnel
		5.2	Minimise the generation of wastes and

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environmental impacts

5.3 Care for and store equipment and materials as required.

Required Skills and Knowledge

Required skills
Required skills include: • identifying and interpreting statutory requirements accurately • confirming type, quantity and quality of data needed for defined monitoring activity • planning and preparing for field activities • undertaking reconnaissance and evaluating monitoring sites • observational skills, including the ability to ‘step back’, question and interpret those observations • assembling, testing, operating and closing down a field-based, sound monitoring station • packaging and transporting supplies, equipment and instruments into the field • identifying and establishing a secure field monitoring site according to defined criteria • using noise measurement instrumentation to obtain verifiable, quantitative results • correcting and adjusting sound pressure level measurements and calculating required noise parameters • performing automatic and manual measurement and calibration procedures • responding effectively to problems, changed or unforeseen circumstances • identifying and rectifying basic instrument faults • researching and summarising existing data and reports • seeking advice when issues/problems are beyond scope of competence/responsibility • communicating effectively and writing/compiling concise and accurate reports • working safely
Required knowledge
Required knowledge includes: • appropriate terminology for noise measurements • principles and concepts of the physics of sound, the physiology of hearing and the measurement of environmental noise • function of key components and operating principles of noise measurement instrumentation • effects on test results of modifying equipment/instrument variables • data processing procedures to convert measured values to final reportable data • specific legislation, policies and codes of practice related to environmental noise

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measurement, noise limits • procedures for maintaining, storing and transporting noise measurement equipment and instrumentation • relevant health, safety and environment requirements, including field safety principles

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative and regulatory framework relevant to noise monitoring • using noise measurement terminology accurately • planning and conducting a noise survey to produce valid data • operating, maintaining and calibrating noise measurement instrumentation to obtain reliable results • performing field tests in accordance with written instructions/enterprise procedures and obtaining reliable data • manipulating raw data to obtain corrected and adjusted data in the required format • applying basic principles of sound and noise science to evaluate noise data • providing accurate, complete records of noise measurements, field observations, data and results • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024007A Collect and evaluate meteorological*

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	data • *MSL974007A Undertake environmental field-based monitoring.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • noise measuring equipment, data loggers and telemetry equipment, vehicles, survey equipment, cameras, consumables and manuals • work program, enterprise procedures, codes of practice, maps and field protocols.
Method of assessment	The following assessment methods are suggested: • review of noise measurements, results and calculations provided by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures and works safely • oral and written questioning to check the candidate's understanding of the principles of noise measurement, operation of noise instruments and processing of data • observation of the candidate performing a range of noise measurement tasks • review of workplace documentation completed by the candidate. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • occupational health and safety (OHS) • Australian and international standards, such as: • AS 1055.1:1997 Acoustics - Description and measurement of environmental noise - General procedures • AS 1055.2:1997 Acoustics - Description and measurement of environmental noise - Application to specific situations • AS 1055.3:1997 Acoustics - Description and measurement of environmental noise - Acquisition of data pertinent to land use • AS IEC 61672.1:2004 Electroacoustics - Sound level meters - Specifications • AS IEC 61672.2:2004 Electroacoustics - Sound level meters - Pattern evaluation tests • AS IEC 60942:2004 Electroacoustics - Sound calibrators • Environmental Protection Authority (EPA) or government departmental guidelines and manuals, such as: • Noise Measurement Manual (QLD EPA) • A Guide to Measurement and Analysis of Noise (VIC EPA) • Noise Guide for Local Government (NSW) • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. sustainable development and impact assessment) • OHS national standards and codes of practice

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	• site-specific requirements • specific environmental standards
Principles of noise measurement	Principles of noise measurement may include: • noise terminology: • sound and noise • frequency, pitch and wavelength • sound power and acoustic energy • sound pressure and sound pressure level • sound intensity • noise measurement units (dBA and others) • frequency weighting curves • adding and subtracting sound levels • physiology of hearing • perception of noise • sources of noise • typical noise levels • types of noise: • continuous • intermittent • impulsive • point sources and line sources
Purpose of noise measurement	Purpose of noise measurement may include: • assessing compliance with a statutory condition, such as a licence • investigation of a noise complaint • environmental impact assessment studies • long-term monitoring programs • occupational hygiene • noise surveys
Noise measurements and surveys	Noise measurements and surveys may include: • difference between sound power and sound pressure • frequency analysis and weighting networks (including at least A and Lin) • calculation of combined sound levels using graphical and mathematical equation techniques • methods for measuring noise exposure, including equivalent continuous sound level (L_{eq}) • components of a sound level meter • response rates for sound meters, including at least fast, slow, impulse and peak • hold circuits

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	• integrating sound level meters • calibration of sound level meters, including both electrical and acoustic • common errors in sound level measurement, including mishandling of equipment, wind, humidity, temperature, reflected and absorbed sound, and background noise • background noise calculations • techniques for conducting noise level measurement • statistical analysis, including L_{Aeq}, L_{A10}, L_{A50} and L_{A90} • time weighted exposure measurement (L_{AeqT}) • characterisation of noise by octave band analysis • background noise level (L_{A90}) • day and night sound levels (L_{DN}) • noise dosimeters • techniques for measuring different noise types, including steady noise, discretely varying noise and impulsive noise • calculation of individual noise exposure • noise mapping • noise rating curves • sound attenuation with distance and mathematical calculation of quantities linked to it • general guidelines for making sound measurements • effects of meteorological conditions on noise • effects of topography and built structures on noise
Noise monitoring instruments and ancillary equipment	Noise monitoring instruments and ancillary equipment may include: • type 1 and type 2 portable sound level meters • integrating and non-integrating sound level meters • noise dose meters • sound level calibrators • octave analysers • statistical analysers, data loggers and recorders • telemetry equipment • sound monitoring stations • microphones • wind shields
Additional resources and equipment	**Additional resources and equipment** may include: • meteorological instruments: • thermometers • hygrometers

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	• barometers • anemometers • digital cameras • global positioning system (GPS) equipment • maps and aerial photographs • noise measurement and survey forms • personal protective equipment
Meteorological measurements	**Meteorological measurements** may include: • temperature • relative humidity • barometric pressure • wind speed and direction
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Hazards	Hazards may include: • solar radiation, dust and noise • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of field work and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025009A Perform sampling and testing of air

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to collect and test gaseous and particulate components in ambient, indoor and occupational air. Personnel will normally work within an existing sampling or monitoring plan. They will continually monitor levels of risk, apply specified safe working procedures and use prescribed safety equipment. Note that sampling and testing of odours is covered in MSS025010A Assist with odour source assessment and MSS025011A Assist with odour field assessment.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services involved with sampling and monitoring of ambient air, indoor air and workplace air parameters
- occupational hygiene
- environmental compliance, auditing and inspection.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Confirm air sampling and testing requirements with supervisor	1.1	Review available site information, such as site plan, sampling/testing locations and history of sampling/testing
		1.2	Confirm the scope and purpose of air sampling/testing and data requirements
		1.3	Confirm sampling methods, locations, numbers and types of samples, and duration/frequency of sampling from enterprise or client's sampling plan
		1.4	Check that all air sampling/testing procedures are in accordance with client or enterprise requirements, relevant standards and guidelines
2	Prepare for air sampling and testing	2.1	Identify site and sampling/testing hazards and review enterprise safety procedures
		2.2	Liaise with relevant personnel to arrange site access and obtain all clearances and/or permits, as necessary
		2.3	Review field sampling procedures and sample preparation methods required for specific laboratory tests
		2.4	Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit
		2.5	Ensure all reagents, solutions, standards and blanks (as appropriate) are obtained and/or ready for field use
		2.6	Select field test equipment/instruments and check operation and calibration, as required, in accordance with procedures and manufacturer instructions
		2.7	Assemble, check, stow all sampling equipment, field test equipment, materials, containers and safety equipment
		2.8	Arrange suitable transport to, from and around

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			site, as required
3	Conduct sampling of air	3.1	Locate sampling sites and, if required, services at the site
		3.2	Conduct representative sampling in accordance with sampling plan and defined procedures for field and/or laboratory testing
		3.3	Ensure all controls, blanks and replicate samples are properly integrated into the sampling process
		3.4	Record all information and label samples in accordance with traceability requirements
		3.5	Record environmental conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity
		3.6	Transport all samples back to base according to enterprise procedures and relevant guidelines
4	Conduct field and laboratory testing of air	4.1	Take sufficient measurements of all samples and standards, if appropriate, to obtain reliable data
		4.2	Obtain sample or subsample for designated field test or locate established locations for in-situ testing
		4.3	Set up, check/calibrate and operate equipment, instruments, reagents, gases and in accordance with test methods/procedures and manufacturer instructions
		4.4	Perform tests, procedures and any observations in accordance with specified methods/procedures
		4.5	Record all field/laboratory observations and results and ensure that they are accurately transferred to enterprise information management system

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5	Process and interpret air data	5.1	Review test data noting atypical observations
		5.2	Ensure calculated values are consistent with expectations
		5.3	Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required
		5.4	Record processed results in accordance with enterprise procedures
		5.5	Interpret trends in data and/or results and report out-of-specification or atypical results promptly to appropriate personnel
		5.6	Determine if obvious procedure or equipment problems have led to atypical data or results
		5.7	Compare results with established air quality standards, statutory environmental quality concentration limits or similar, if relevant
		5.8	Finalise reporting of results in accordance with enterprise requirements
6	Maintain a safe work environment	6.1	Rehabilitate sampling site to render it safe and to minimise environmental impact
		6.2	Clean all equipment, containers, work area and vehicles according to enterprise procedures
		6.3	Check serviceability of all equipment before storage
		6.4	Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
		6.5	Minimise the generation of wastes and environment impacts
		6.6	Ensure the safe collection of all hazardous wastes for appropriate disposal

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Required Skills and Knowledge

Required skills
Required skills include: • planning and preparing for field activities • observational and descriptive skills • collecting representative samples in accordance with a sampling plan and method • using appropriate techniques to preserve the integrity of samples • demonstrating correct and safe use of field/laboratory instruments and/or equipment, including calibration • using air quality measurement instrumentation to obtain verifiable, quantitative results • identifying and rectifying basic instrument faults • identifying atypical data and samples and taking appropriate action • maintaining sampling equipment • completing accurate records of sampling, test data and results • communicating effectively and writing/compiling concise and accurate reports • responding effectively to changed or unforeseen circumstances • seeking advice when issues/problems are beyond scope of competence/responsibility • following requirements for the disposal of waste and the preservation of the environment • working safely
Required knowledge
Required knowledge includes: • appropriate terminology for atmospheric science, air measurement and air pollution • the structure, circulation and composition of the atmosphere • atmospheric stability, lapse rates and inversions • localised meteorology and dispersion of air pollutants • air pollutants, such as: • particulates (inorganics, organics and metals) • inorganic gases (CO, CO_2, NO_x, SO_x, ammonia, acid rain, halogens and ozone) • organic gases (hydrocarbons; oxygen, halogens, sulfur and nitrogen containing organics) • photochemical smog, greenhouse gases and ozone depletion • principles of air quality sampling and analysis, methods and standards • function of key components and operating principles of common air quality instruments • specific legislation, policies and codes of practice related to air pollution and air quality monitoring • field sampling and monitoring procedures, including labelling and traceability • relevant health, safety and environment requirements, including field safety principles

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative and regulatory framework relevant to air quality • using air quality measurement terminology accurately • interpreting and applying site air sampling/monitoring plans and procedures • collecting reliable, representative air samples in accordance with methods/procedures • operating, maintaining and calibrating air quality measurement instrumentation to produce consistently valid and accurate results • interpreting gross features of data, identifying atypical results as out-of-normal range or an artefact and making relevant conclusions • calculating results using appropriate units/precision • providing accurate, complete records of sampling and testing observations, data and results • working safely and follow relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL974003A Perform chemical tests and procedures* • *MSL974009A Undertake field-based remote sensing* • *MSS025016A Perform sampling and testing of*

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	stationary emissions. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • vehicles, survey equipment, air sampling/monitoring equipment, cameras, consumables and manuals • work program, enterprise procedures, codes of practice, maps and field protocols.
Method of assessment	The following assessment methods are suggested: • inspection of air samples collected by the candidate • review of air quality measurements, test results, calculations and observations produced by the candidate • review of sampling/testing records completed by the candidate • feedback from peers and supervisors about the candidate's ability to consistently apply enterprise procedures and work safely • oral and written questioning to check the candidate's understanding of the principles of air quality sampling/testing, operation of air sampling equipment, test instruments and processing of data • observation of the candidate performing a range of air sampling and testing tasks. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

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Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic set:2007 Environmental management basic set • AS 2365 series Methods for the sampling and analysis of indoor air • AS 2986 series Workplace air quality • AS/NZS 3580 series Methods for sampling and analysis of ambient air • AS/NZS 2922 Guide for the siting of sampling units (air monitoring) • National Environment Protection Measure (NEPM) (Ambient Air Quality) • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Ambient air parameters	Ambient air parameters may include: • inorganic gases: • CO and CO_2 • $NO_{x,}$

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	• SO_x • acid gases • hydrogen sulfide • ozone • fluorides • organic gases: • methane and non-methane hydrocarbons • poly-aromatic hydrocarbons (PAHs) • organic oxidants and other photochemical smog compounds (e.g. poly-aromatic nitrates (PANs)) • air toxics: • benzene, toluene and xylenes • formaldehyde • Benzo(a)pyrene (PAH marker) • particulates: • deposited matter • suspended matter (PM_{10}, $PM_{2.5}$ and PM_1) • particulate fluorides • lead
Indoor air parameters	Indoor air parameters may include: • inorganic gases, such as: • CO and CO_2 • NO_x • radon • organic gases such as: • formaldehyde • poly-aromatic hydrocarbons (PAHs) • organic oxidants and other photochemical smog compounds e.g. poly-aromatic nitrates (PANs) • particulates such as: • PM_{10}, $PM_{2.5}$, and PM_1 • microorganisms and spores
Occupational (workplace) air parameters	Occupational (workplace) air parameters may include: • chemicals listed in the '*Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment'*. Concentration levels for action are: • peak • short term exposure limit (STEL) • time weighted average (TWA)
Sampling equipment	Sampling equipment may include:

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	• gas sample bags • gas sample bottles/containers • gas pipettes • gas syringes • air sampling pumps • sampling manifolds • passive diffusion samplers • impingers (with absorption solutions) • solid adsorbents • colour detection tubes • coated and uncoated filters • sampling trains in continuous gas monitors • pitot tubes • high volume samplers • dichotomous samplers • gas flow meters
Testing equipment	Testing equipment may include: • continuous gas monitors: • ultraviolet (UV) absorption (e.g. ozone) • chemiluminescence (e.g. NO_x) • pulsed fluorescence (e.g. (SO_x) • non-dispersive infrared (e.g. CO) • flame ionisation detection (FID) (e.g. methane) • photo ionisation detection (PID) • integrating nephelometer methodologies (e.g. suspended particulates) • oxygen sensors (e.g. zirconia) • gas chromatographs • mass spectrometers • atomic absorption spectrophotometers • infrared spectrophotometers • UV-visible spectrophotometers • tapered element oscillating microbalance (TEOM) • beta gauges • particle counters • portable (handheld) gas monitors
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • field notebooks or log books • standard operating procedures covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures,

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	instrument fault-finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • requirements related to protection of the environment • incident/accident/injury report forms
Additional equipment	Additional equipment may include: • navigation and communication equipment (e.g. compass, maps, GPS, two-way radio and mobile phone) • electric generators and power leads • calibration gases • data loggers • first aid equipment
Hazards	Hazards may include: • solar radiation, dust and noise • exposure to toxic gases • electrical hazards • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and consumables, and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

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Custom Content Section

Not applicable.

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MSS025010A Assist with odour source assessment

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to assist air quality scientists and engineers with assessing odour emissions from sites and the effectiveness of odour abatement systems. Personnel use site sampling and monitoring plans, enterprise procedures and/or standardised methods to collect odour samples and conduct olfactometry measurements using panellists in the laboratory. Note that odour field assessment using olfactometry panellists and community volunteer observers is covered in *MSS025011A Assist with odour field assessment.*

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air, odours and air quality consultancy)
- environmental compliance, auditing and inspection
- chemical, food and by-product process manufacturing
- solid waste management
- water treatment and wastewater management
- agricultural/livestock activities
- landfill operations
- rendering operations.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Clarify site monitoring requirements with supervisor	1.1	Examine available information about the site's history, current activities/processes, previous odour assessments, topography, prevalent meteorological conditions and complaint records
		1.2	Visit the site with supervisor to clarify issues with the proponent and community representatives, as appropriate
		1.3	Collect and review information about site process operations and conditions
		1.4	Identify potential odour sources at the site and current controls
		1.5	Review relevant legislative, regulatory and licensing requirements or enterprise procedures/test methods
2	Prepare for source monitoring	2.1	Select, or design, appropriate sampling and monitoring strategies in consultation with supervisor
		2.2	Confirm details of relevant odour sampling/monitoring plans, need for site permits and access to the site
		2.3	Confirm data format and quality requirements
		2.4	Review relevant standards and/or specified enterprise procedures/test methods
		2.5	Assemble required sampling and monitoring equipment and check that all reusable items are clean, fit for purpose and calibrated correctly
		2.6	Ensure that all required supplies and equipment are transported safely to and from the site

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3	Prepare standardised or in-house odour panellists	3.1	Confirm the specifications for panellists with supervisor, and client as necessary
		3.2	Conduct standardised selection to determine odour threshold and ongoing olfactometry performance of individuals
		3.3	Conduct standardised or in-house selection to assess and compare sensitivity against internal criteria
		3.4	Select panellists in consultation with supervisor
		3.5	Train selected panellists in the use of objective odour observation techniques, odour descriptors, olfactometry procedures and test equipment
		3.6	Record the process and results used to establish and maintain a register of reliable panellists
4	Collect and store odour samples for source monitoring	4.1	Check that process/meteorological conditions are consistent with sampling design conditions and report any deviations
		4.2	Set up sampling equipment and conduct pre-use checks to ensure reliable operation
		4.3	Collect samples in accordance with standard methods or enterprise procedures
		4.4	Store samples for subsequent analysis to ensure their ongoing integrity and traceability
		4.5	Identify and report any defects or abnormalities in samples
		4.6	Record all sample information in accordance with standard methods or enterprise procedures
5	Conduct laboratory olfactometry measurements	5.1	Set up dynamic olfactometer and related equipment and conduct pre-use checks to ensure reliable operation
		5.2	Ensure that panellists fully understand the test procedures

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		5.3	Conduct tests in accordance with standard method
		5.4	Monitor panellist's performance for indications of odour fatigue, adaption of their senses to the surrounding ambient air and/or bias
		5.5	Analyse the conduct of the measurements and reliability of results before confirming data acceptability
6	Maintain a safe work environment	6.1	Ensure safety through the use of specified safety equipment, safe work procedures and personal protective clothing
		6.2	Handle all samples and equipment in accordance with enterprise safety procedures
		6.3	Minimise generation of waste and environmental impacts
		6.4	Collect and dispose of all wastes safely
		6.5	Report hazards and incidents to designated personnel using enterprise procedures
7	Record data and report results	7.1	Record details of the testing process and data in accordance with standard method or enterprise procedures
		7.2	Process data and report results in accordance with standard method or enterprise procedures
		7.3	Record approved data in accordance with specified format and quality requirements
		7.4	Maintain confidentiality and security of enterprise information and data

Required Skills and Knowledge

Required skills

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Required skills include:

- listening and communicating effectively with clients and panellists
- negotiating with stakeholders and reaching satisfactory agreements, where possible
- organising field sampling and laboratory testing activities efficiently
- interpreting and analysing information, procedures and attending closely to detail
- providing accurate information about odours and odour monitoring, instructing odour olfactometry panellists
- applying odour sampling and monitoring procedures (e.g. labelling, storing, transporting and traceability of samples)
- using sampling equipment (e.g. pre-use checks) and olfactometry instruments correctly and safely, and identifying/rectifying basic equipment faults
- responding effectively to changed or unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely for the protection of self and others

Required knowledge

Required knowledge includes:

- understanding of chemical/process engineering relevant to site
- terminology, such as olfactometry, odour threshold, odour intensity, hedonic tone, odour character or quality, odour nuisance, dilution to threshold, odour concentration, odour units (ou), and commonly used odour descriptors
- calculating flow rates, dilution factors, odour emission rates and uncertainties
- regulatory/licensing requirements that apply to site
- nature of odour complaints, possible health effects, typical community concerns and environmental issues about odour
- basic principles of atmospheric chemistry, odorous compound families, meteorology
- enterprise procedures and test methods for odour sampling and monitoring
- set-up and operation of sampling equipment and dynamic olfactometers in the laboratory, function of key components, simple troubleshooting and calibration checks
- control of the olfactory testing environment (e.g. conditions that can dull sensitivity)
- likely causes of variation in odour results and their control
- reporting requirements, protocols for the confidentiality and security of information and communicating with the community and media
- relevant health, safety and environment requirements

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • accurately interpreting client requests, enterprise procedures and legislative/regulatory requirements • selecting suitable panellists under supervision • communicating effectively with clients and panellists • collecting and preparing odour samples in accordance with standard methods or enterprise procedures • using olfactometry equipment to obtain reliable data • processing odour data and confirming its acceptability • communicating the significance of odour results, including the discussion of any errors and/or unexpected variation to appropriate personnel • reporting results and completing all records in the required format and timeframe • working safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025002A Assess the environmental risk or impact of a project activity or process* • *MSS025004A Provide environmental information to customers* • *MSS025011A Assist with odour field assessment.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • odour sampling and measuring equipment • standard laboratory with facilities, equipment, materials and reagents for required measurements • enterprise procedures, standard test methods and

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	equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of odour data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, standard test methods and works safely • feedback from clients and panellists about the candidate's handling of enquiries and information • oral/written questioning associated with odour sampling, odour measurements and calculations • observation of the candidate collecting odour samples and conducting olfactometry testing and/or instructing panellists. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • The Environmental Protection Act 1986

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	• state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS/NZS 4323.3:2001 Stationary source emissions - Determination of odour concentration by dynamic olfactometry • AS/NZS 4323.4:2009 Stationary source emissions - Area source sampling - Flux chamber technique • SAA HB 9 Occupational personal protection • data quality procedures • enterprise procedures for sampling, monitoring, checking calibration of dynamic olfactometers • equipment manuals and warranties, supplier catalogue and handbooks • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice
Odour sources and geometries	Odour sources may include: • waste water treatment plants, sludge ponds • solid waste recycling plants • landfill and landfill gas treatment plants • chemical plants • composting operations, food and by-product processing, such as rendering and tanning plants • agriculture/livestock facilities, such as poultry and pig farming, cattle feedlots and mushroom farms Odour source geometries may include: • point, area, volume and fugitive sources
Information about the site and industrial activities	Information about the site and industrial activities collected by air quality scientists and engineers may include: • location of site and nearby buildings, topography and meteorological records • complaints, and previous odour assessments at site and nearby locations • other industrial activities or potential odour sources in the surrounding area • industrial process inputs/outputs, flow diagram and

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	process flowchart • unit operations and typical variability, nominal and upset conditions • pollution control equipment and techniques for industrial processes • air emission control systems, such as scrubbers, bag filters, stacks and bio filters • forced or natural ventilation within odorous buildings • parameters of emission sources, such as location, geometry, and release parameters for processes • operational conditions and period of operation • batch or continuous operation for units upstream from the emission source • predictable variations in process conditions, production rates and weather interaction
Complaint records	Complaint records may include: • date and time of the complaint, and complainant details • odour characteristic and weather conditions • actions undertaken to verify the complaint • actions undertaken to fix the issue • back communication/information to complainant
Odour sampling/monitoring plans	Odour sampling/monitoring plans may include: • monitoring protocol with details of purpose, duration, scope, available resources, detailed procedures and data quality requirements • site map showing key community features, plant boundaries, possible/confirmed odour sources and topography • monitoring at the source with sampling locations, sampling conditions (process and meteorology), type of sampling, coding and numbers of samples • data collection forms (e.g. source location, geometry, operational conditions, sampling strategy and design deviations)
Odour sampling and laboratory monitoring equipment	Odour sampling and laboratory monitoring equipment may include: • sampling bags, such as Teflon, Tedlar and Nalophan • portable wind tunnel sampling systems • fluxhood/fluxchamber/isolation chamber sampling systems • sorbent sampling tubes and stainless steel canisters

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	for collecting volatile organic compounds (VOCs) • tubing, pumps, carbon filters and diluter • sweep gases for sample collection, such as nitrogen • tracer gas for calibration, such as carbon monoxide (CO) • reference material, such as 1-butanol • dynamic olfactometers for laboratory use
Pre-use checks of sampling and monitoring equipment	Pre-use checks of sampling and monitoring equipment may include: • cleanliness of reusable items • leak testing of sample bags, preparation of VOC canisters and sampling equipment • pump pressures and flow rate of sweep gases calibration checks • olfactometer (range, accuracy, precision and lowest detection limit (LDL)) • n-butanol storage • cleanliness of the measurement room of the olfactometry laboratory
Selection and training for laboratory panellists	Selection and training for laboratory panellists may include: • use of the reference material (n-butanol) to determine odour threshold and performance of individuals in relation to normative values • use of standard dynamic olfactometry procedures • effects of alertness, attention, fatigue and health status • odour descriptor assignation • odour panel calibration results (AS/NZS 4323.3:2001 Stationary source emissions - Determination of odour concentration by dynamic olfactometry) and traceability of the panellist tests
Odour laboratory condition requirements	The odour testing environment in the laboratory requires an odour-free environment and includes: • no stray source odours (e.g. renovation, furniture, equipment and stored chemicals) • effective ventilation with filtered air conditioning • temperature control • no direct sunlight exposure • noise-free room
Odour monitoring data	Odour monitoring data may include:

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	• emission source characteristics, such as air velocity, dimensions of a vent or area, temperature, humidity, partial pressure, adjustments made for high temperature and/or high pressure and/or high humidity flows, and ventilation rates • sampling data, such as sampling start/end times, type of equipment, sampling location within the source, meteorological and process conditions, ambient temperature, pressure and humidity, diluter use and dynamic dilution rate, sampling flow rates, and any deviations from the requirements of the standard or internal procedure • laboratory measurement data, such as identification of the panellist, temperature of the room, date and time of the measurement, chemical analyser and olfactometer operational parameters, odour panel calibration result, set of dilutions over the measurements rounds, average dilution for the panel at the odour threshold, odour concentration result and uncertainty, and any deviation from the requirements of the standard or internal procedure
Odour control strategies	Odour control strategies may include: • physical, such as adsorption, absorption, photo ionisation, masking and neutralisation • chemical, such as scrubbing, oxidation and incineration • biological, such as biofiltration using bacteria • combined, such as bioscrubbers
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025011A Assist with odour field assessment

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to assist air quality scientists and engineers with assessing odour impacts from sites on the surrounding community and the effectiveness of odour abatement systems. Personnel use odour monitoring plans and enterprise procedures or standardised methods to conduct olfactometry measurements in the field using olfactometry panellists and community volunteer observers. Note that sampling at the source and laboratory odour measurements are covered in *MSS025010A Assist with odour source assessment.*

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air, odours and air quality consultancy)
- environmental compliance, auditing and inspection
- chemical, food and by-product process manufacturing
- solid waste management
- water treatment and wastewater management
- agricultural/livestock activities
- landfill operations
- rendering operations.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Clarify site monitoring requirements with supervisor	1.1	Examine available information about the site's history, current activities/processes, previous odour assessments, topography, prevalent meteorological conditions and complaint records
		1.2	Visit the site with supervisor to clarify issues with the proponent and community representatives, as appropriate
		1.3	Collect and review information about site process operations and conditions
		1.4	Identify potential odour sources at the site and current controls
		1.5	Identify suitable locations in the surrounding areas for impact assessments by panellists and community observers
		1.6	Review relevant legislative, regulatory and licensing requirements or enterprise procedures/test methods
2	Prepare for field monitoring	2.1	Select or design appropriate monitoring strategies in consultation with supervisor
		2.2	Confirm details of relevant odour monitoring plans, need for site permits, access to the site and nearby locations, and/or community concerns with supervisor
		2.3	Confirm data format and quality requirements
		2.4	Review relevant standards and/or specified enterprise procedures/test methods
		2.5	Draft/revise community survey, questionnaire and/or field record forms and seek supervisor and client approvals prior to use

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		2.6	Assemble required monitoring equipment and check that all items are fit for purpose and calibrated correctly
		2.7	Ensure that all required supplies and equipment are transported safely to and from the field
3	Manage odour complaints	3.1	Use survey/questionnaires to collect information about community odour perceptions and verify complaints
		3.2	Record and report community concerns in accordance with enterprise procedures
		3.3	Assist with provision of authorised information about odour perception, sources, possible health effects and details of current/planned monitoring to community members
4	Prepare standardised or in-house odour panellists	4.1	Confirm the specifications for panellists with supervisor, and client as necessary
		4.2	Conduct standardised selection to determine odour threshold and ongoing olfactometry performance of individuals for supra-threshold levels
		4.3	Conduct standardised or in-house selection to assess and compare sensitivity against internal criteria
		4.4	Select panellists in consultation with supervisor
		4.5	Train selected panellists in the use of objective odour observation techniques, odour descriptors, olfactometry procedures and test equipment (with site visit and odour identification when possible)
		4.6	Record the process and results used to establish and maintain a register of reliable panellists
5	Prepare community	5.1	Confirm the specifications for community volunteer observers with supervisor

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	volunteer observers	5.2	Explain the details of the requested task to community volunteer observers in consultation with supervisor
		5.3	Conduct observer selection using enterprise procedures
		5.4	Select observers in consultation with supervisor
		5.5	Train selected observers in the use of objective odour observation techniques, tools, odour descriptors and test equipment in accordance with the enterprise recording tools and objectives
		5.6	Record the process and results used to establish and maintain a register of reliable observers
6	Conduct field monitoring with panellists and observers	6.1	Check that process/meteorological conditions are consistent with monitoring design conditions and report any deviations
		6.2	Set up monitoring conditions for panellists and observers and check equipment to ensure reliable operation
		6.3	Ensure that panellists fully understand the test procedures
		6.4	Prepare reference for field measurements with the selected panel in accordance with standardised method or enterprise procedures
		6.5	Conduct monitoring in accordance with standard method or enterprise procedures
		6.6	Monitor panellist’s performance for indications of odour fatigue, adaption of their senses to the surrounding ambient air and/or bias
		6.7	Identify and report any defects or abnormalities in monitoring conditions
		6.8	Analyse the conduct of the measurements and reliability of results before confirming data acceptability

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7	Maintain a safe work environment	7.1	Ensure safety through the use of specified safety equipment, safe work procedures and personal protective clothing
		7.2	Handle all samples and equipment in accordance with enterprise safety procedures
		7.3	Minimise generation of waste and environmental impacts
		7.4	Collect and dispose of all wastes safely
		7.5	Report hazards and incidents to designated personnel using enterprise procedures
8	Record data and report results	8.1	Record details of the testing process and data in accordance with standard method or enterprise procedures
		8.2	Process monitoring and meteorological data and report results in accordance with standard method or enterprise procedures
		8.3	Record approved data in accordance with specified format and quality requirements
		8.4	Maintain confidentiality and security of enterprise information and data

Required Skills and Knowledge

Required skills
Required skills include: • listening and communicating effectively with clients, panellists and community members • negotiating with stakeholders to reach satisfactory agreements, where possible • organising laboratory (for potential panellists selection) and field activities efficiently • interpreting and analysing information, procedures and attending closely to detail • providing accurate information about odours and odour monitoring, and instructing community odour observers and olfactometry panellists • applying odour monitoring procedures (e.g. traceability of measurements) • using monitoring equipment and olfactometry instruments correctly and safely, and

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identifying and rectifying basic equipment faults • responding effectively to changed or unforeseen circumstances • seeking advice when issues/problems are beyond scope of competence/responsibility • working safely for the protection of self and others, especially when transporting and managing panellists in the field
Required knowledge
Required knowledge includes: • chemical/process engineering relevant to site • terminology, such as olfactometry, odour threshold, odour intensity, hedonic tone, odour character or quality, odour nuisance, dilution to threshold, odour concentration, odour units (ou), and commonly used odour descriptors • regulatory/licensing requirements that apply to site • nature of odour complaints, possible health effects, typical community concerns and environmental issues about odour • use/design of questionnaires to collect reliable information • calculating flow rates, dilution factors, odour emission rates and uncertainties • basic principles of atmospheric chemistry, odorous compound families and meteorology • enterprise procedures and test methods for odour monitoring • set-up and operation of dynamic olfactometer in the laboratory for panellists selection, function of key components, simple troubleshooting and calibration checks • likely causes of variation in odour results and their control • enterprise procedures for the recording of field data • reporting requirements, protocols for the confidentiality and security of information and communicating with the community and media • relevant health, safety and environment requirements

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and context. Critical aspects of assessment and evidence include: • accurately interpreting client requests, enterprise

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	procedures and legislative/regulatory requirements • selecting suitable field panellists and/or community observers under supervision • communicating effectively with clients, observers, panellists and community members • using olfactometry equipment to obtain reliable data • managing odour field panellists and community observers • processing odour data and confirming its acceptability • communicating the significance of results, including the discussion of any errors and/or unexpected variation to appropriate personnel • reporting results and completing all records in the required format and timeframe • working safely for the protection of self and others.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025002A Assess the environmental risk or impact of a project activity or process* • *MSS025004A Provide environmental information to customers* • *MSS025010A Assist with odour source assessment.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • odour measuring equipment • equipment, materials and reagents for field measurements • enterprise procedures, standard test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of odour data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures, standard test methods and works safely • feedback from clients, observers, panellists about the

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	candidate's handling of enquiries and information • oral/written questioning associated with odour measurements, calculations, a simulated case study about regulatory field assessment and community surveys • observation of the candidate conducting olfactometry testing and/or instructing observers/panellists. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • The Environmental Protection Act 1986 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • Australian and international standards, such as: • AS/NZS 4323.3:2001 Stationary source emissions - Determination of odour concentration by dynamic

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	olfactometry • *VDI 3940-2*:2006 Measurement of odour impact by field inspection - Measurement of the impact frequency of recognizable odours - plume measurement • *VDI 3940*-3:2010 Measurement of odour impact by field inspection - Determination of odour intensity and hedonic odour tone • VDI 3882-1:1992 Olfactometry - determination of odour intensity • SAA HB 9 Occupational personal protection • data quality procedures • enterprise procedures for monitoring and checking calibration of dynamic olfactometers • equipment manuals and warranties, supplier catalogue and handbooks • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice
Odour nuisance	Odour nuisance involves the cumulative effects of odour on people and may include: • perceived intensity and offensiveness of odour • perceived duration and frequency of occurrence • difficulty in coping with the odour at a specific time and location • a belief that the odour has a negative effect on their wellbeing and health
Odour sources and geometries	Odour sources may include: • wastewater treatment plants and sludge ponds • solid waste recycling plants • landfill and landfill gas treatment plants • chemical plants • composting operations, food and by-product processing, such as rendering and tanning plants • agriculture/livestock facilities, such as poultry and pig farming, cattle feedlots and mushroom farms Odour source geometries may include: • point, area, volume and fugitive sources
Information about the site and industrial activities	Information about the site and industrial activities collected by air quality scientists and engineers may include: • location of site and nearby buildings, topography and

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	meteorological records • complaints, previous odour assessments at site and nearby locations • other industrial activities or potential odour sources in the surrounding area • industrial process inputs/outputs, flow diagram and process flowchart • unit operations and typical variability, and nominal and upset conditions • pollution control equipment and techniques for industrial processes • air emission control systems, such as scrubbers, bag filters, stacks and bio filters • forced or natural ventilation within odorous buildings • parameters of emission sources, such as location, geometry, and release parameters for processes • operational conditions and period of operation • batch or continuous operation for units upstream from the emission source • predictable variations in process conditions, production rates and weather interaction
Odour monitoring plans	Odour monitoring plans may include: • monitoring protocol with details of purpose, duration and scope (parts of the community involved, available resources, detailed procedures and data quality requirements) • site map showing key community features, plant boundaries, possible/confirmed odour sources, topography, and most exposed or likely future sensitive receptors • field monitoring with panellist/observer locations (e.g. addresses, global positioning system (GPS) coordinates), and periods of measurement • data collection forms (e.g. observer/panellist locations, intensity levels measurements, weather conditions, odour descriptors, and observer comments and identifier)
Complaint records	Complaint records may include: • date and time of the complaint and complainant details • odour characteristic and weather conditions • actions undertaken to verify the complaint • actions undertaken to fix the issue

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	• back communication/information to complainant
Community observer questionnaires	Community observer questionnaires may include: • use of standard terminology and questions to avoid/minimise bias • telephone interviews • newspaper notices inviting responses • diaries to collect data, such as odour strength, characteristics, date, time and location of detection, wind speed and direction, and physical reactions (e.g. itchy eyes and difficulty breathing) • face-to-face interviews with community members
Odour monitoring equipment	Odour monitoring equipment may include: • dynamic olfactometers for laboratory use when preparing panellists • reference material, such as n-butanol • torch, stopwatch and GPS • anemometer and thermometer
Pre-use checks of odour monitoring equipment	Pre-use checks of odour monitoring equipment may include: • cleanliness of reusable items • range, accuracy, precision and lowest detection limit (LDL) for dynamic olfactometer prior to preparing panellists • n-butanol storage • cleanliness of the measurement room of the olfactometry laboratory • batteries for torch, stopwatch, GPS, anemometer and thermometer
Selection and training for field and internal panellists and community observers	Selection and training for field panellists for regulatory requests may include: • use of the reference material (n-butanol) to determine odour threshold and performance of individuals in relation to normative values • use of standard dynamic olfactometry procedures • odour intensity ranking test • triangle test • odour descriptor assignation • training with odours relevant to survey objectives • effects of alertness, attention, fatigue, health status, suggestibility (imagining an odour) and variability/inconsistency of the odour detection in the

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	field • odour panel calibration results (AS/NZS 4323.3:2001 Stationary source emissions - Determination of odour concentration by dynamic olfactometry) and traceability of the panellist tests Selection and training for internal (in reference with the plant) field panellists may include: • internal procedures that may include n-butanol pens, odour descriptor assignation with an odour wheel, odour intensity ranking test, and triangle test • training with odours relevant to survey objectives • basic weather data descriptions • effects of alertness, attention, fatigue, health status, suggestibility (imagining an odour) and variability/inconsistency of the odour detection in the field • effects of 'adaptation' (reduced perceptibility) due to internal panellists' workplace location Selection and training for community volunteer observers may include: • procedures that may include n-butanol pens, odour descriptor assignation with an odour wheel • training with odours relevant to survey objectives • selection criteria, such as location, availability, known health problems with symptoms impacting on olfactory sense, and relevant previous training/work • use of 'objective' odour observation techniques • basic weather data descriptions • use of information recording forms • effects of alertness, attention, fatigue, health status, variability/inconsistency of the odour detection in the field and suggestibility (imagining an odour)
Odour monitoring data	Odour monitoring data may include: • odour source conditions at time of the assessment • field odour measurement data, such as identification of the field panellist/community observer; date, time, duration and location of the assessment; operational process conditions if available; intensity and odour characteristic reference scale used for the test; diaries or observation record sheets from community observers; table with all panellist's and observer's observations; meteorological conditions at the time of the assessment; any atypical conditions in the area of the assessment; processing data and interpretation;

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	and reporting
Odour control strategies	Odour control strategies may include: • physical, such as adsorption, absorption, photo ionisation, masking and neutralisation • chemical, such as scrubbing, oxidation and incineration • biological, such as biofiltration using bacteria • combined, such as bioscrubbers
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025012A Perform environmental microbiological tests

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to receive and prepare samples, identify and quantitate examples of microorganisms of environmental significance. Personnel will also be able to apply an understanding of the role of microorganisms in bioremediation, agriculture and industrial processes.

Application of the Unit

This unit of competency is applicable to environmental technicians working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, groundwater and soil)
- natural resource management
- occupational hygiene monitoring (e.g. air)
- groundwater and clean water (e.g. catchments, supply and environmental flows)
- water treatment, storm and wastewater management
- site remediation or rehabilitation.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024010A Perform environmental biological techniques

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Receive microbiological samples	1.1	Check samples and accompanying documentation in accordance with enterprise procedures
		1.2	Log samples and record sufficient details to enable accurate tracking and chain of custody
		1.3	Distribute samples for local testing or dispatch samples to other testing facilities, as necessary
		1.4	Store samples appropriately where testing or transport is to be delayed
2	Prepare for safe microbiological work and aseptic applications	2.1	Select work area and equipment required for the safe handling of materials that may contain microorganisms of specified risk groups
		2.2	Wear protective clothing, replacing it when contamination is suspected
		2.3	Apply correct disinfection procedures to work areas before and after use
		2.4	Locate relevant emergency equipment for timely response to microbiological accidents
		2.5	Apply standard precautions when handling biological materials
		2.6	Minimise the production and release of aerosols, using biological safety cabinets, where necessary
		2.7	Clean up spills, and report all spills and suspected incidents to supervisor
		2.8	Wash hands before and after laboratory work and when contamination is suspected
		2.9	Ensure the safe collection and disposal of biohazardous materials and other laboratory wastes in accordance with enterprise procedures

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3	Process samples for direct examination	3.1	Prepare thin smears of samples for subsequent staining to enable microscopic identification of cells
		3.2	Prepare liquid films of specimens for direct observation of cell structure
		3.3	Prepare samples to concentrate material for subsequent staining or microscopy
4	Prepare pure cultures for microbiological work and aseptic applications	4.1	Select culture media to maximise growth of microorganisms and cells
		4.2	Inoculate media aseptically, applying techniques suitable for purpose of culture
		4.3	Incubate inoculated media in conditions to optimise growth of organisms and cells
		4.4	Subculture on suitable media to optimise production of pure cultures
5	Perform environmental microbiological analyses	5.1	Identify major microorganisms and groups of microorganisms in air, water and soil samples
		5.2	Count cells in undiluted samples to indicate the dilution necessary to reliably count organisms in culture
		5.3	Prepare serial dilutions of samples aseptically for culture and colony counting
		5.4	Count colonies for calculating number of viable organisms per unit volume
		5.5	Count microorganisms in samples and cultures using spectrometric and electronic methodologies, where relevant
		5.6	Estimate and document uncertainty of measurement in accordance with enterprise procedures, where relevant

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		5.7	Use rapid detection techniques to monitor the presence of microorganisms in water
		5.8	Use indicator organisms to estimate the likely presence of other pathogenic species
6	Examine test data for legislative compliance	6.1	Confirm data are the result of valid measurements
		6.2	Report details of sampling/testing procedures and quality assurance in accordance with legislative requirements
		6.3	Report data in the required format with the appropriate accuracy, precision, statistic type and units
		6.4	Compare data with specified assessment criteria
		6.5	Comment on any significant data trends and identify the possible causes or implications
		6.6	Identify atypical or out-of-range results and the risk and/or instances of potential/actual non-compliance
		6.7	Confirm all unexpected findings with supervisor
7	Maintain records	7.1	Enter approved data and results into enterprise information management system
		7.2	Maintain instrument logs as required by accreditation checklists
		7.3	Maintain security and confidentiality of all client information, data, test results and records

Required Skills and Knowledge

Required skills
Required skills include:

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- interpreting sampling/testing procedures, manuals and guidelines
- using protective clothing and biological safety cabinets
- setting up, using and maintaining sampling/testing equipment
- performing tasks for the culture, isolation, identification and use of microorganisms
- preventing contamination of oneself, other people, the work area, equipment or the samples and materials under test
- preventing contamination of media or reagents during manipulations/transfer of cultures
- identifying artefacts or image aberrations attributable to misalignment or obstruction of light paths or condensers used in bright field, dark ground, phase and fluorescent microscopy, or with other steps in microscopic examinations
- identifying Gram reactions
- describing bacterial colony forms on common media used in environmental investigations
- using numeracy skills for enumerating microorganisms
- preparing documentation that is accurate, concise and in accordance with enterprise and/or legislative requirements
- seeking advice when issues/problems are beyond scope of competence/responsibility
- reporting incidents or accidents
- disinfecting spillage and safely disposing of all contaminated materials
- decontaminating the work area upon completion of work
- working safely

Required knowledge

Required knowledge includes:

- relevant microbiological terminology in the areas of bacteriology, parasitology and mycology
- cell biology and chemistry related to laboratory phenomena, such as growth and isolation of organisms for identification
- microbial genetics
- microbial diversity
- microorganisms of importance in assessment of the natural environment
- diseases associated with air, water, and soil-borne microorganisms
- transmission and infection mechanisms and vectors
- population growth curves for microorganisms
- anti-microbial agents and their suitability/efficacy in a variety of situations
- relevant disinfection and sterilisation procedures
- rationale for sample dilution when preparing materials for enumerating organisms and other pure culture work (e.g. most probable number (MPN) technique)
- need for accurate identification of sample source (e.g. field location)
- sampling procedures for the microbiological testing of drinking water which should conform to the guidelines published by the National Health and Medical Research Council (NHMRC), the Australian Water Resources Council

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- testing procedures for the microbiological content of air, water and soil which should be guided by advice of relevant national and state/territory environment protection agencies
- identification of indicator microorganisms to assist in determining the cause, time or nature of pollution
- use of microorganisms in wastewater treatment
- use of microorganisms in toxic spill recovery
- use of microorganisms in site remediation
- collection and disposal of waste, waste minimisation principles
- relevant health, safety and environment requirements

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • safely performing tasks for the culture, isolation, identification, enumeration and use of microorganisms • not contaminating self, other people, the work area, equipment or the samples or materials under test, or media or reagents during manipulations involving transfer of cultures • identifying artefacts or image aberrations attributable to misalignment or obstruction of light paths or condensers used in bright field, dark ground, phase and fluorescent microscopy, or with other steps in microscopic examinations • identifying Gram reactions accurately • accurately describing bacterial colony forms on common media used in bacteriological investigations • comparing microbiological data with relevant assessment criteria and drawing logical conclusions • preparing data and documentation that is accurate, concise and in accordance with enterprise requirements • disinfecting any spillage and safely disposing of all

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	contaminated materials • decontaminating the work area upon completion of work • working safely and reporting all incidents or accidents.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025001A Assist with assessing site environmental indicators* • *MSS025002A Assess the environmental risk or impact of a project activity or process.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • a standard microbiology laboratory with relevant equipment, samples and reagents • enterprise procedures, test methods and equipment manuals. Under duty of care requirements, off-the-job training providers will only use samples and organisms of a risk category compatible with their laboratory as defined in *AS/NZS 2243.3:2010 Safety in laboratories - Microbiological aspects and containment facilities.*
Method of assessment	The following assessment methods are suggested: • review of results/data/records generated by the candidate • feedback from peers and supervisors about the candidate's ability to consistently apply enterprise procedures and work safely • oral and/or written questions associated with testing of environmentally significant microorganisms and record keeping • integrated assessment with a case study focus, such as the isolation and identification of bacterial species in a specimen containing two or more species, by relating sample, cultural, morphological and biochemical data, and such from other relevant tests and procedures.

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	In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • Australian and international standards, such as: • AS/NZS 4276 series Water microbiology • AS/NZS 3896:2008 Waters - Examination for *legionellae* spp. including *Legionella pneumophila* • Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand 2000, Australian guidelines for water quality monitoring and reporting, National Water Quality Management Strategy No. 7, ANZECC & ARMCANZ, Canberra

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	• AS/NZS 2031:2001 Selection of containers and preservation of water samples for microbiological analysis • AS/NZS 3666 series Air-handling and water systems of buildings - microbial control • NOHSC:1003 Adopted national exposure standards for atmospheric contaminants in the occupational environment • American Public Health Association (APHA) Handbook - Water and wastewater analysis • data quality procedures • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice
Environmental microbiological tests	Environmental microbiological tests may include: • identification of major groups of environmentally significant organisms, such as: • bacteria, Cyanobacteria, Corynebacteria, *Legionella pneumophila*, *Lactobacillus*, *Rhizobia*, hydrocarbon utilising bacteria, and sulfite reducing bacteria • Total Coliforms, Faecal Coliforms, *Escherichia coli*, *Enterococci* and Faecal *Streptococci* • Archaea • *Aspergillus* • micro-algae, blue-green algae • anaerobic protozoa • indicator microorganisms and their role in predicting likely infectious agents • enumeration of organisms, and use of counting chambers • use of selective and enriched media and their role in identification and enumeration of microorganisms, such as: • MacConkey’s agar (Coliforms) • BG11 (Cyanobacteria) • yeast mannitol agar (*Rhizobium*) • lactose broth • ammonium salts • nutrient agars • tryptic soy agar

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	• biochemical tests, such as IMViC (indole, methyl red, Voges-Proskauer and citrate) • use of antibiotics, such as cycloheximide (detection of bacteria in presence of yeasts and mould) • micro-toxicity testing • microbial activity in soils
Equipment, materials and systems	Equipment, materials and systems may include: • protective and physical containment facilities and equipment for safe handling of microorganisms personal protective equipment, such as gloves, gowns, masks and safety glasses, and gloves for working with extremes of heat and cold • carbon dioxide cabinets and incubators • transfer equipment, such as inoculating loops, pipettes (quantitative and qualitative), flasks, tubes and spatulas • liquid nitrogen containers for cell storage • filtration membranes • microscopes with bright field and other relevant illumination systems and stereomicroscopes • counting chambers for micro-enumeration • colony counting devices • Bunsen burners and bench incinerators • incubators and water baths • anaerobic jars, fermentation chambers, continuous culture systems and other devices for controlling growth environments of microorganisms • laboratory information management systems (LIMS), databases, record and filing systems • stains, media, reagents and biological materials necessary for laboratory testing • laboratory glassware and measuring equipment • disinfecting and sterilising solutions and equipment, such as ultraviolet (UV) lamps • materials suitable for the safe containment, collection, processing and disposal of biological and non-biological wastes • autoclaves
Legislative compliance	Legislative compliance may involve: • comparison and interpretation of data in comparison with assessment criteria, limits and other regulatory requirements, such as: • exposure standards for atmospheric contaminants in

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	the occupational environment • guidelines for drinking water • allowable pollution index for public recreation areas • discharge of sewage and allowable contamination levels • drawing conclusions about air quality, water quality, and the condition of ecosystems
Use of microorganisms in bioremediation, agriculture and industrial processes	**Use of microorganisms in bioremediation, agriculture and industrial processes** may include: • treatment of wastewater (especially in sewage) • sulphite reducing bacteria • remediation of oil spills using microorganisms, such as HCB, pseudomonas • production of eco-friendly fuels, such as ethanol
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025013A Assist with assessing and monitoring wetlands

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to plan and conduct desktop and field activities designed to collect and interpret information about the characteristics and condition of specific wetlands. This work assists environmental scientists and planners to develop wetland inventories, assess and monitor the condition of wetlands and/or develop wetland management plans.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- stormwater management
- clean water (e.g. catchments, supply and environmental flows)
- environmental services, such as monitoring of water quality
- environmental compliance, auditing and inspection.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

1	Confirm details of assigned activities with supervisor	1.1	Clarify the scope and objectives of assigned activities, constraints and wetland components involved and any conservation measures or management plans in place
		1.2	Identify regulations, standards, guidelines and enterprise procedures that apply to assigned activities
		1.3	Clarify the required outputs, timeframe, available resources and stakeholder involvement
		1.4	Confirm assessment indices and data collection plan details for target wetland
		1.5	Clarify the use of survey proformas, data collection forms and/or field identification guides, as necessary
2	Source and assess available wetland data	2.1	Locate and obtain existing wetland data and review its relevance and accuracy
		2.2	Locate external sources of relevant data sets and assess their availability, price, value and limitations
		2.3	Obtain selected data sets in accordance with enterprise procedures
		2.4	Use available data to identify known wetland boundaries, characteristics, condition and any environmental issues relevant to the study
		2.5	Identify any significant information gaps
3	Plan and organise assigned field activities	3.1	Analyse field activities to identify related tasks and plan efficient sequences
		3.2	Identify risks, safety and environmental requirements associated with field activities
		3.3	Assemble required field equipment and materials and check that they are fit for purpose

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		3.4	Liaise with relevant personnel to explain the scope and purpose of field activities, organise site access and obtain permits, as necessary
		3.5	Review work plan in response to new information, changed circumstances or instructions from appropriate personnel
		3.6	Update work plan and communicate changes to appropriate personnel, as necessary
4	Conduct wetland survey and monitoring activities	4.1	Observe and record wetland characteristics and evidence of disturbance using survey proformas, field identification guides and digital photography, as appropriate
		4.2	Collect reliable point positional data and attribute environmental data/samples for each location in accordance with data collection plan
		4.3	Verify any existing geographic information system (GIS) mapping of wetland location/type
		4.4	Collect representative water, soil and/or (micro)biological samples using specified sampling methods and equipment
		4.5	Obtain valid and reliable in-situ measurements using specified test methods and equipment
		4.6	Ensure that monitoring data/samples are collected at the same locations and during similar seasonal/climatic conditions
5	Finalise field work	5.1	Pack and safely transport all samples, equipment and supplies back to home base
		5.2	Ensure all samples and data are labelled and stored safely to ensure integrity and traceability
		5.3	Ensure dispatch of collected samples for subsequent analysis
		5.4	Clean and test equipment before storage

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6	Contribute to assessment of wetland condition	6.1	Review field observations, measurements and/or results of laboratory analyses to identify significant trends and/or problems with data
		6.2	Use given formulae and tables to assign scores, parameter values, index values and health index/rating, where appropriate
		6.3	Analyse data relating to wetland characteristics, existing conditions and management values, as required
		6.4	Identify environmental issues that may impact on current wetland management objectives/practices
		6.5	Report findings using a format and style that suits their intended use and in accordance with enterprise guidelines
		6.6	Communicate results within the specified time and in accordance with enterprise confidentiality and security guidelines
7	Maintain a safe work environment	7.1	Use safe work procedures and protective equipment to ensure personal safety and that of others
		7.2	Minimise environmental impacts of testing/sampling and generation of waste
		7.3	Collect and/or dispose of all waste in accordance with environmental requirements and enterprise procedures

Required Skills and Knowledge

Required skills
Required skills include: • interpreting procedures, guidelines and manuals • locating and evaluating wetland information

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- planning and conducting assigned desktop/field activities efficiently
- making 'objective' observations based on clear criteria
- demonstrating correct and safe use of sampling/measuring equipment (including pre-use checks) to obtain valid samples and data
- identifying and rectifying basic equipment faults
- estimating numbers of flora and fauna, % coverage, and measuring dimensions and areas
- assigning assessment scores, index values, health index/rating, and calculating scientific quantities, uncertainties and unit conversion factors
- analysing findings of field work to produce reliable results and logical conclusions
- providing written reports that meet user needs
- communicating effectively with others, such as enterprise staff, members of the public, clients, landowners and consultants
- responding effectively to changed or unforeseen circumstances
- seeking advice when issues/problems are beyond scope of competence/responsibility
- working safely

Required knowledge

Required knowledge includes:

- specific legislation, policies and guidelines relevant to field activities
- sources of wetland information (e.g. directories, indexes, data sets and assessment tools)
- basic terminology and principles of wetland assessment, monitoring and management
- defining characteristics and functions of major wetland types
- fundamental principles of ecology and assessment of site environmental indicators
- environmental factors that impact on soils, water quality, population and diversity of flora and fauna
- procedures and equipment for collecting soil, water, (micro) biological samples and environmental measurements (e.g. water)
- procedures and equipment for maintaining, storing and transporting samples/specimens to ensure their wellbeing, viability and integrity
- procedures and equipment for basic spatial and environmental measurements
- enterprise procedures for the recording of field data and reporting of findings
- protocols for the confidentiality and security of information and communicating with the community and media
- relevant health, safety and environment requirements

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different contexts. Critical aspects of assessment and evidence include: • planning and safely conducting survey and monitoring activities for a range of wetlands that meet user needs • accessing and using existing environmental data sets • obtaining reliable field samples and measurements • providing detailed descriptions of wetland characteristics, existing conditions, management values, environmental issues and possible causes • completing all documentation in the required format and timeframe • working safely and minimising environmental impacts.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024005A Collect spatial and discrete environmental data* • *MSS024006A Perform sampling and testing of water.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • access to a range of wetlands • sampling equipment, field instruments and materials • enterprise procedures, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of wetlands data, results and records prepared by the candidate • feedback from peers and supervisors that the candidate consistently follows enterprise procedures,

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	sampling/measurement procedures and works safely • oral/written questioning associated with surveys and monitoring of wetlands, sampling/measurement equipment and procedures and wetland assessment techniques • observation of the candidate collecting samples and conducting field tests in wetlands. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, guidelines, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • protection of wetlands • vegetation management • nature conservation and wildlife/plant protection • water quality and water management

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	• soil conservation • pollution and contaminated sites • Australian and international standards, such as: • RAMSAR Convention • AS/NZS 5667 set Water quality • A Directory of Important Wetlands in Australia, Environment Australia • ANZECC Wetland Classification System • National Water Commission Framework for the Assessment of River and Wetland Health (FARWH) • state/territory Environmental Protection Authority (EPA) indexes, guidelines and manuals, such as: • Index of Wetland Condition (VIC EPA) • Water Quality Sampling Manual (QLD EPA) • Regulatory monitoring and testing: Water and wastewater sampling (EPA SA) • Wetland Assessment Techniques Manual for Australian Wetlands (Wetlandcare Australia)
Wetlands	Wetlands may include: (ANZECC classification) • marine and coastal zone wetlands • inland wetlands • human made wetlands State/territory classification systems for wetlands vary and may include: • riverine • palustrine (river, run-off/rainfall, groundwater fed) • lacustine • artificial • marine • spring or groundwater fed
Desktop and field activities	Desktop and field activities may include: • accessing relevant data sets and using GIS techniques to map wetland areas, high conservation areas and/or high degradation areas; and determining priority areas for field assessments • validating GIS mapping of wetland location and type • conducting rapid wetland assessments • assessing condition of specific wetland components, including flora and fauna (type, % cover, dominant species and condition buffers) • collecting information for use in wetland vegetation inventory

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	• assessing disturbance and relating this to wetland condition • trialing a wetland monitoring program • establishing sites for future wetland monitoring
Wetland management plan	A wetland management plan may include: • existing and future values of wetland • wetland management objectives to protect these values • problems and issues that may compromise these objectives • agreed wetland management practices to mitigate existing impacts and minimise future impacts
Wetland data sources and data	Wetland data sources and data may include: • national databases, such as: • Directory of Important Wetlands in Australia • EPBC Online Protected Matters Search Tool • state/territory databases, such as: • Regional Ecosystem (RE) maps, Wildlife Online, Wildnet, Ecosystem Health Monitoring Program (EHMP) surveys (EPA QLD) • Index of Wetland Condition (EPA VIC) • geographic information system GIS datasets, such as: • climate • biological and physical parameters of the land and ocean • management boundaries and tenure • biodiversity • natural resources, agriculture and fisheries • land use information, such as topographical maps, aerial photos, satellite imagery and land use/zoning maps • terrain models • drainage intensity, flood and drainage studies • water and sediment quality studies • contaminated site reports • acid sulphate soil studies • aquatic ecology studies (e.g. threatened/scheduled species, migratory birds, key habitats and habitat corridors/connectivity) • riparian vegetation studies • reports of consultations with the scientific community, local environmental groups and industry

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	associations, catchment management committees, and councils
Survey proformas, data collection forms and field identification guides	Survey proformas and data collection forms will vary greatly with scope and objectives of survey/monitoring activities but data fields may include: • observer identification details (ID) • site ID, (sub) catchment and/or regional ID • ownership, access, location (e.g. global positioning system (GPS)), site photo ID and transect ID • verification of wetland classification (GIS mapped, field) using identification guides and codes • proximity of other wetlands, ecosystems, roads and current/adjacent land use • site disturbance indicators, such as soil disturbance, vegetation structure modification, water quality, hydrologic disturbance, dumping, land use, feral/domestic animals, and weed causal factors • acid sulphate soil indicators, such as iron stain, scald and hydraulic conductivity • general wetland characteristics, such as: • water body dimensions, current/max water level, depth, water sources, modifications and banks • water quality (e.g. visible slime, temperature, turbidity and electrical conductivity) • habitat potential • vegetation buffer/cover/types/health/dominant species/recovery potential • fauna observations Field identification guides may include: • descriptors, photos and/or coding for wetland types and specific disturbance indicators
Field equipment and materials	Field equipment and materials may include: • topographic maps and aerial photos • compass, survey point markers and drivers, GPS, tape measure, flagging tape, $1m^2$ quadrats and sub-quadrats • data recording sheets, palm pilot, laptop, data logger, digital camera and binoculars • sampling equipment, such as bottles, bags, biological specimen containers, secateurs, scoop nets, esky and ice, sample preservatives, water pumps and tubing, and shovels • automatic water samplers

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	• portable water quality probe that measures (e.g. dissolved oxygen, temperature, turbidity, pH, conductivity and field test reagents) • flow meters • personal protective equipment, insect repellent, appropriate clothing and footwear, phone, emergency position indicating radio beacon (EPIRB) and first aid kit
Laboratory analyses	Laboratory analyses may include: • suspended solids • phosphates • nitrates and ammonium • peroxide oxidation (combined acidity and sulfate for soils)
Environmental issues and possible causes	Environmental issues and possible causes may include: • fragmentation or loss of connectivity of wetlands and/or vegetation • adjacent land use pressure causing excessive nutrients, sediment and noise pollution • human disturbance due to vehicles, boats, fire, rubbish, excessive nutrients and sediments, and impacts of feral/stock/domestic animals • exposure of acid sulphate soils • low diversity of vegetation, invasion by weeds • poor habitat potential due to invasion by pest species and land clearing • structures affecting wetland hydrology • poor condition of banks and fringing vegetation due to access of stock • poor condition of mangrove, salt marsh, seagrass due to impaired natural flow/tidal flush, excessive human disturbance, and impaired vegetative filter strips
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by

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	the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025014A Perform sampling and testing of contaminated sites

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to collect samples and conduct field tests/measurements while working safely in a (potentially) hazardous environment. Personnel work under the close supervision of environmental scientists or engineers and use established site health and safety plans and sampling/field testing procedures. They are required to continually monitor levels of risk and use prescribed safe working procedures and safety equipment. The specific details of sampling and field testing for groundwater and soils are covered in other relevant units. Details for other samples, such as surface water, air and radiation are covered in the units listed in the *Context of Assessment*.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air quality, water and soil)
- environmental compliance, auditing and inspection
- management of pollution and contaminated sites
- site remediation or rehabilitation.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024008A Recognise common geological landforms and samples

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Assist with preliminary site study	1.1	Locate and review relevant legislative, regulatory and/or planning requirements and register for contaminated sites
		1.2	Confirm the site location, scope and purpose of the investigation and assigned tasks with supervisor
		1.3	Source and review available site data, including site history, geology, hydrogeology and meteorological data
		1.4	Summarise information to assist with preparation of a site chronology and identification of gaps or inadequacies in data, potential contaminants and areas of possible contamination
2	Prepare for site activities	2.1	Confirm the scope and purpose of sampling, testing and/or monitoring activities and data requirements with supervisor
		2.2	Liaise with site controller to access site, identify locations of services and arrange for induction, clearances and/or permits, as necessary
		2.3	Review risks posed by site contaminants and review the health and safety plan and safe work procedures specified for planned activities
		2.4	Confirm the sampling/test methods, sampling/test points, numbers and types of samples and/or measurements with supervisor
		2.5	Review specified sampling/test methods with close attention to the sequence of steps and details for each
		2.6	Check the operation/calibration of required sampling equipment, test and/or monitoring instruments in accordance with relevant methods,

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			standards and manufacturer instructions
		2.7	Check the operation/calibration of required sampling equipment, test and/or monitoring instruments in accordance with relevant methods, standards and manufacturer instructions
		2.8	Ensure all required reagents, solutions and/or calibration standards are obtained and ready for field use
		2.9	Assemble and safely stow all sampling equipment, test instruments, materials, containers, safety equipment and personal protective equipmentArrange suitable transport to, from and around site as required
3	Assist with site inspection	3.1	Sketch, map and/or photograph the site features
		3.2	Conduct a visual inspection to identify site features that may inform the need for and design of subsequent investigations
		3.3	Collect preliminary samples, as directed, to help characterise possible contamination hazards prior to detailed investigations
4	Conduct sampling as directed	4.1	Locate sampling/test points and any services at the site
		4.2	Work effectively with other site personnel during drilling excavation and/or survey operations to collect reliable samples, logs and measurements, as necessary
		4.3	Follow specified procedures to minimise hazards and/or contamination of samples, self/others, equipment and environment
		4.4	Collect and preserve required samples in accordance with sampling plan, relevant methods and/or standards
		4.5	Record all information and label samples in accordance with traceability requirements

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		4.6	Record environmental conditions and/or atypical observations made during sampling that may impact on validity or integrity of samples
		4.7	Store and transport all samples back to base in accordance with specified method, chain of custody requirements and relevant codes
5	Conduct field tests and/or monitoring as directed	5.1	Obtain sample or sub-sample for designated field test
		5.2	Check that all equipment, instruments, reagents and calibration standards are fit for purpose
		5.3	Set up and calibrate instruments as necessary to ensure safe operation and valid results
		5.4	Operate equipment/instruments in accordance with test method requirements
		5.5	Follow specified procedures to minimise hazards and/or contamination of samples, self/others, equipment and environment
		5.6	Perform required measurements and tests on all samples and standards, if appropriate, in accordance with specified methods
		5.7	Keep accurate, complete and traceable records of all field observations and test results
6	Clean, decontaminate and/or dispose of contaminated equipment and materials	6.1	Inspect equipment to assess the degree of contamination
		6.2	Use specified procedures to remove material from the exposed outer surfaces of sampling/test equipment and personal protective equipment
		6.3	Use specified procedures and reagents to neutralise, wash and/or rinse exposed surfaces
		6.4	Collect rinsate blanks for analysis and preserve/store in accordance with specified procedure or standard

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		6.5	Stow items for transport only when thoroughly dry
		6.6	Safely collect all debris and sullage from decontamination in accordance with relevant regulations and codes
7	Finalise site activities	7.1	Arrange for the safe disposal of all hazardous wastes in accordance with relevant regulations and codes
		7.2	Ensure all site observations, sampling/test data and results are accurately transferred to the enterprise information management system
		7.3	Store samples in accordance with method, chain of custody requirements and relevant codes, as necessary
		7.4	Ensure samples are dispatched for analytical testing within recommended holding times
8	Process and interpret data	8.1	Review test/monitoring data noting atypical observations
		8.2	Calculate required quantities using relevant test method and ensure values are consistent with expectations
		8.3	Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required
		8.4	Record processed results in accordance with enterprise procedures
		8.5	Interpret trends in data and/or results and report atypical results promptly to appropriate personnel
		8.6	Determine if obvious procedure or equipment problems have led to atypical data or results
		8.7	Compare results with established threshold levels or environmental quality concentration limits, if relevant

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		8.8	Finalise reporting of results in accordance with enterprise requirement
9	Maintain a safe work environment	9.1	Clean all equipment, containers, work area and vehicles according to enterprise procedures
		9.2	Check serviceability of all equipment before storage
		9.3	Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
		9.4	Minimise the generation of wastes and environment impacts

Required Skills and Knowledge

Required skills
Required skills include: • planning and preparing for working on contaminated sites • communicating effectively with other site personnel, and negotiating access and support • recognising hazards and assessing risks, using risk cards and following 'step back' procedures • interpreting and consistently applying health and safety plans and safe work methods, using safety equipment and personal protective equipment • 'reading the landscape', site observational and descriptive skills • collecting samples in accordance with sampling plan/procedures, standards or instructions • using appropriate techniques to preserve the integrity of samples and transport them safely • demonstrating correct and safe use of sampling/field test equipment and/or analysers, including set-up, pre-use checks, calibration and performance checks • using field test equipment/portable analysers to obtain reliable, quantitative results • identifying and rectifying basic instrument faults • identifying atypical data and samples and taking appropriate action • solving technical problems and responding effectively to changed/unforeseen circumstances • seeking advice when issues/problems are beyond scope of competence/responsibility • completing accurate records of site observations, sampling, test data and results • writing/compiling concise and accurate reports • maintaining, cleaning and decontaminating equipment and personal protective equipment

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• following requirements for the safe collection and disposal of (hazardous) waste and preservation of the environment
Required knowledge
Required knowledge includes: • specific legislation, regulations, standards and codes of practice related to contaminated sites • common terminology used in sampling/testing of air, water and soil at contaminated sites • common site hazard and risks, risk assessment techniques and use of risk cards • properties and health risks associated with groups of contaminants, such as: • asbestos • heavy metals, such as lead, chromium and arsenic • chemical manufacture and industry wastes, such as acids/alkalis, resins, dyes, paints, solvents, fuels, oils, fertilisers, insecticides, herbicides, fungicides, aromatic hydrocarbons, phenols, chlorinated phenols, chlorinated benzenes and organochlorines • safe work methods and equipment, personal protective equipment, and health, safety and environment requirements relevant to site activities undertaken • overview of sampling plan design for contaminated sites, including preliminary sampling, non-targeted/grid sampling, targeted/judgemental sampling, and different sampling strategies for gas, water and soil • sampling/test methods/standards relevant to site activities undertaken • function of key components, operating principles of common sampling/test equipment relevant to site activities undertaken • common procedure/equipment problems leading to atypical data/results • labelling, chain of custody/traceability of samples and management of large volumes of data • recording and reporting procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative, regulatory and planning requirements for

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	contaminated sites • using accurate terminology to describe common contaminants and sampling/test/safety equipment • interpreting and applying site sampling/monitoring plans, sampling/test methods and standards, health and safety plans, and safe work method statements • observing site features accurately and recognising hazards • operating, maintaining and/or calibrating sampling and test equipment to obtain reliable samples and produce consistently valid and accurate results • interpreting gross features of data, identifying atypical results and making relevant conclusions • calculating results using appropriate units/precision • providing accurate, complete records of sampling and test observations, data and results • working safely for the protection of self and others • following relevant legislative/regulatory requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS024006A Perform sampling and testing of water* • *MSS025006A Collect and evaluate groundwater data* • *MSS025007A Perform sampling and testing of soils* • *MSS025009A Perform sampling and testing of air* • *PSPRAD707A Monitor radiation.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • vehicles • safety procedures, safe work methods, sampling and test methods, standards and equipment manuals • appropriate sampling containers sampling/test equipment, analysers, reagents and gases • specified safety equipment, decontamination equipment and reagents • digital camera

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	• global positioning system (GPS), logbooks and data loggers, and computers.
Method of assessment	The following assessment methods are suggested: • inspection of samples collected by the candidate • review of measurements, test results, calculations and observations produced by the candidate • review of sampling/test records and reports completed by the candidate • feedback from supervisor about the candidate's ability to consistently apply enterprise procedures and work safely • oral and written questioning to check the candidate's understanding of the principles of sampling/testing of contaminated sites, operation of sampling equipment, test instruments/analysers and processing of data • observation of the candidate performing a range of sampling and testing tasks. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as

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	• Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental Management Basic Set • AS 4482.1:2005 Guide to the investigation and sampling of sites with potentially contaminated soil - non-volatile and semi-volatile compounds • AS 4482.2:1999 Guide to the investigation and sampling of sites with potentially contaminated soil – volatile substances • guidelines such as: • National Environment Protection Measure Assessment of Site Contamination - Schedule B (2) Guideline on data collection, sample design and reporting • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Site information and sources	Site information may include: • location of site, property details, and current and proposed use • site history details, such as: • site plans, zoning and adjacent land use • current and previous present owners, occupiers, users and contaminating uses/activities • current and previous buildings and structures • site industrial processes, raw materials, products, wastes/discharges and waste disposal locations • product spills/losses, incidents and accidents

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	• sewer and other utilities/services, plans and previous power sources • chemical storage and transfer areas • earth moving activities • interviews, consultations and complaints Sources of information may include: • government departments, such as: • environment, environmental protection, conservation, primary industry, water resources, lands and survey, and planning • agencies, such as: • Bureau of Meteorology • Geoscience Australia • libraries and environmental data sets • companies and employees, community representatives and historical societies
Visual inspection of the site	A visual inspection of the site may include: • current uses of site • disturbed, coloured or stained soil, and bare soil patches • disturbed or distressed vegetation • unusual odour • quality of surface water and surface water drainage • condition of buildings, floors and roads • presence of chemical containers and holding tanks • presence of fill, containment areas, sumps, drains, landfill, and obvious surface hazards, such as asbestos • underground structures that may be associated with sub-surface contamination • condition of materials storage/handling facilities, and solid/liquid waste disposal areas • evidence of off-site migration, on-site spillage of dangerous goods, and staining/sheens on surface water
Scope and purpose of sampling, field tests and/or monitoring	Scope and purpose of sampling, field tests and/or monitoring may include: • determining nature of contamination • determining concentration and distribution of contamination • identifying types and concentrations of contaminants for assessing potential exposure levels/risks

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	• monitoring site conditions to check licence compliance or determine need for remedial action • rapid analysis of samples that may change between collection and analysis • rapid sample analysis during remediation activities • determining if clean-up has been achieved • screening of samples in the field
Samples	Samples may include: • air, soil gases and dust • soils • surface water and groundwater • radiation • replicates, field and trip (transport) blanks, rinsate blanks and background samples
Field tests and monitoring	Field tests and monitoring may include: • soil profile measurements and depth of fill • measurement of bores and water depth • screening of gas/vapours, soil and water samples using: • colour and texture • bioluminescence/toxicity test kits • colorimetric methods and dye shake tests • pH, electrical conductivity, redox potential, temperature, dissolved oxygen and ammonia concentration • photoionisation detectors (PID) • flame ionisation detectors (FID) • gas detectors • portable infrared analysers for methane and carbon monoxide (CO) • portable X-ray fluorescence spectrum analyses • field gas chromatography • measurement of radiation
Hazards/risks	Hazards/risks may include: • solar radiation, dust and noise • exposure to contaminants, such as chemicals, biohazards and radiation • working on uneven surfaces and in confined spaces • manual handling of heavy objects • crushing, entanglement and cuts associated with moving machinery and hand tools

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	• heavy vehicle traffic on site
Safety procedures and equipment	Safety procedures may include: • preparation/approval of site health and safety plan for sampling/testing, and safe work permits/approvals • use of safe work method statements, site safety induction, risk cards, 'step back' and safety checks • use of (disposable) personal protective equipment • ensuring two persons are present • monitoring of atmosphere for hazardous gases • working upwind of known contaminants • prohibition of eating, drinking and smoking • decontamination facilities, procedures and materials for plant, equipment and personnel • safe collection and disposal of hazardous waste • careful handling of glass containers • separation of heavy equipment into smaller units/cases for transport • reporting procedures for safety problems • emergency procedures, access for emergency vehicles • regular medical checks Safety equipment may include: • personal protective equipment, such as boots, helmets, gloves, eye and ear protection, overalls, face masks and filters, respirators, encapsulated suits, safety harness and safety torches • gas monitors, gas detectors, personal monitors, environmental monitors and radiation dosimeters • communication equipment (e.g. two-way radio and mobile phone) • materials safety data sheets (MSDS) • first aid equipment
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and consumables, and require standard precautions to be applied • where relevant, users should access and apply current

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	industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS025015A Plan and conduct environmental project work

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to plan and conduct a small scale, low risk, measurement-based environmental project. Personnel may work individually, or as part of a team. They are expected to develop and confirm a project brief/plan with their supervisor, execute and document the project, and evaluate the outcomes. The unit does not cover procurement of project resources and contract management.

Application of the Unit

This unit of competency is applicable to environmental technicians working in all industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Scope project with supervisor	1.1	Clarify project aim, objectives and timeframe
		1.2	Identify intended outcomes, key stakeholders, drivers and likely constraints

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		1.3	Identify key activities, milestones and resources required to achieve deliverables on time
		1.4	Agree on performance indicators to monitor project progress and acceptance criteria for deliverables
2	Prepare project plan in consultation with supervisor	2.1	Identify relevant legislation, standards, codes, procedures and/or enterprise requirements
		2.2	Locate and review background information to inform the development of project methodology
		2.3	Analyse risks for all aspects of project work
		2.4	Consider a range of strategies for conducting the project, including alternative measurement methods
		2.5	Outline feasible and measurable project objectives, selected methodology, outputs and the roles and responsibilities of participants
		2.6	Consider integration and sequencing of tasks as part of optimising work breakdown structure
		2.7	Present draft project plan and work schedule to supervisor for review and approval
3	Review project methodology	3.1	Conduct trials to refine methodology and/or provide proof of concept, as necessary
		3.2	Troubleshoot equipment and methodology problems and develop/test solutions in consultation with supervisor, as necessary
		3.3	Modify draft project plan, as necessary
		3.4	Document all accepted/rejected ideas and/or prototypes from trials
4	Execute project plan and analyse	4.1	Communicate plan to other participants, as necessary

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	outcomes	4.2	Safely operate measurement equipment/instruments in accordance with manufacturer requirements, test methods and enterprise procedures
		4.3	Obtain data using specified methods and in accordance with safety and legislative/regulatory/enterprise requirements
		4.4	Record and store data in agreed formats
		4.5	Recognise anomalous results and investigate causes
		4.6	Evaluate data using specified quality criteria and reference materials
		4.7	Use appropriate mathematical/statistical/graphical methods and software to analyse and present results
		4.8	Report results using the appropriate accuracy, precision and units
5	Report project progress and outcomes	5.1	Provide progress reports/project outputs on time and at the required quality standard
		5.2	Evaluate the project process and outputs in comparison with the project objectives and performance criteria
		5.3	Identify any issues and opportunities for improvement
		5.4	Prepare project reports containing the required information and using the agreed style, voice and format
		5.5	Complete and store all project documentation
		5.6	Present final report of project process and outcomes to supervisor

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Required Skills and Knowledge

Required skills
Required skills include: • interpreting relevant legislative/regulatory/enterprise requirements, equipment manuals, test and sampling methods • using enterprise tools to recognise and assess risks associated with project activities • preparing project plans and work schedules • setting up, operating and maintaining equipment/instruments • applying safe work procedures and equipment to avoid hazards and control risks • processing data using relevant mathematical/statistical/graphical methods • evaluating results and drawing logical conclusions about quality and compliance with legislative/regulatory requirements • seeking advice when issues/problems are beyond scope of competence/responsibility • presenting measurement results in specified formats • critically evaluating project process, measurement methodology, and outputs against performance criteria • preparing oral/written reports and project presentations using enterprise guidelines • working safely
Required knowledge
Required knowledge includes: • relevant environmental and measurement terms, concepts and principles • relevant legislative/regulatory/enterprise requirements • enterprise and/or regulator sampling, monitoring and testing procedures that apply to assigned project activities • project management principles • enterprise project planning, management and reporting requirements • enterprise procedures for identifying/assessing and controlling hazards/risks associated with project activities • relevant health and safety requirements and enterprise safe work procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills in this unit of competency in new and different situations and context. Critical aspects of assessment and evidence include: • researching background information for the project to inform selection of sampling/test/measurement methods and project methodology • complying with relevant legislative/regulatory requirements and enterprise procedures • analysing project requirements and conducting trials to develop a feasible, cost-effective and efficient plan • using available project management procedures and tools to develop plans and monitor/report progress • seeking advice/assistance when difficulties are beyond scope of responsibility or technical competence • working safely • providing quality deliverables on time • evaluating project process and outputs.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • environmental monitoring units, such as the *MSS024000A and MSS025000A series units of competency.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history • legislative/regulatory requirements • specified sampling and testing methods/procedures • relevant enterprise project management procedures, tools and software • physical resources required for work activities, such as map, laptop computer, digital/video camera, sampling and monitoring, survey and testing equipment and instruments.

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Method of assessment	The following assessment methods are suggested: • review of project plans/trials, records, outcomes and reports prepared by the candidate • feedback from managers and project team members about the candidate's ability to plan and conduct environmental project work effectively • questioning/interview to assess the candidate's understanding of project management principles and their ability to plan and conduct projects and deal with unforseen challenges • observation of the candidate's interactions with project team members • presentation of project plan, objectives, process and outputs, and lessons learned to an appropriate audience. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999

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	• Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS 5667 Set:1998 Water quality sampling • state and territory regulator sampling and testing manuals and guidelines (e.g. Environmental Protection Authority (EPA)) • Australian Dangerous Goods Code ADG7 • occupational health and safety (OHS) national standards and codes of practice • enterprise environmental management plans and procedures for specific sites and/or activities (e.g. sampling, monitoring, construction and mining)
Background information	Background information may include: • site or project history • client history • records of consultations with stakeholders • emergency plans and safety procedures • site access protocols and permits • maps (road and topographical) • existing databases (e.g. vegetation, topography, soils and regional ecosystem maps) • legislative/regulatory requirements • enterprise environmental management plans for site • enterprise, regulatory or standard methods/procedures for environmental sampling, monitoring or in-field testing • manufacturer information or manuals for environmental equipment

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	• relevant case studies and good practice models
Environmental project work	Environmental project work will be consistent with the roles and responsibilities of an environmental officer and may include collecting and presenting data related to: • outdoor air quality • water quality • noise • surface water, environmental flows, groundwater and catchment studies • hydrological surveys • occupational hygiene (e.g. air quality, noise and radiation) • ecology studies • soil surveys • geotechnical surveys • contaminated site management (with appropriate risk analysis and supervision) • land management • coastal management • wetland management • stormwater management • energy technologies and services • waste management
Environmental measurements	Environmental measurements could involve real or simulated work activities and may include: • in-field sampling and testing • conducting flora and/or fauna surveys • conducting soil surveys and soil profiling at a site • commissioning or modifying field equipment or instruments • establishing or modifying environmental monitoring stations • growth of species of environmental interest under controlled conditions • remediation trials • laboratory testing of environmental samples
Project plan	Project plan may include: • scope • objectives • work breakdown structure • sampling/testing/monitoring/survey methods

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	• available resources (e.g. equipment and personnel) • specific roles and responsibilities of participants • budget and cost estimates • data quality requirements and assurance procedures • risk analysis and control measures • safety requirements and related work procedures • stakeholders and consultation procedures • milestones • output/project deliverables and their acceptance criteria • project management procedures covering planning, risk analysis, communications and reporting • project management software and tools, such as Gantt and program and evaluation review technique (PERT) charts, critical path method, and records of costs and inputs
Risks and hazards	Risks and hazards may include: • exposure to solar radiation, dust and noise • exposure to severe weather conditions • personnel getting lost • manual handling of heavy objects • injuries caused by power tools, generators and moving machinery • vehicle and boat handling in rough/remote conditions • presence of hazardous materials on site and/or exposure to harmful radiation, contamination and microorganisms • accidents, emergencies and incidents, such as snake, insect or animal bites
Safety procedures and control measures	Safety procedures and control measures may include: • use of personal protective equipment, such as sunscreen, hats, safety glasses, gloves, coveralls and safety boots • ‘stay with vehicle’ and other survival techniques • regular communication schedule • global positioning system (GPS), maps and aerial photos • handling, storage and disposal of all hazardous materials/waste in accordance with MSDS, labels, enterprise procedures, codes and regulations • use of specified safe work procedures for tasks
Mathematical/statistical/graphical	Mathematical/statistical/graphical methods and software

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methods and software	may include: • determination of linear, logarithmic, exponential and power relationships • regression lines and correlation coefficients • uncertainty calculations • frequency and probability plots • parametric statistical tools, such as t-test, z-test, binomial and analysis of variance (ANOVA) • non-parametric statistical tools, such as Chi-square test • spreadsheets and databases
Project documentation	Project documentation may include: • sampling, monitoring, survey or in-field test data and results • records of equipment use • records of time spent and approved expenditure • emails and correspondence • records of consultations • progress reports • final reports/briefings
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

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Custom Content Section

Not applicable.

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MSS025016A Perform sampling and testing of stationary emissions

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to collect and test gaseous and particulate components in air pollution emissions from stationary sources. Personnel work in pairs with a senior stack tester or air pollution engineer and use specified sampling points and sampling/test methods. They continually monitor hazards and risks in the work area, apply specified safe working procedures and use prescribed safety equipment. Note that this unit does not cover laboratory analysis of samples (e.g. gravimetric, moisture content and gas analysis) which is addressed in units such as *MSL974003A Perform chemical tests and procedures* and *MSL975020A Apply routine spectrometric techniques*. Sampling and testing of source odours is addressed in the unit *MSS025010A Assist with odour source assessment*.

Application of the Unit

This unit of competency is applicable to environmental technicians in a range of industry sectors, such as:

- environmental services (e.g. sampling and monitoring of air, odour, and air quality consultancy)
- environmental compliance, auditing and inspection
- management of pollution in chemical, food and by-product, mineral process manufacturing and energy production.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm stack sampling/testing requirements with supervisor	1.1	Confirm the site location, scope and purpose of stack sampling/testing, relevant standards and data requirements
		1.2	Review available information about the site, its industrial processes, details of sampling/testing locations and any previous sampling/testing results for emissions
		1.3	Select possible sampling/analyser train configurations to suit type and likely concentration of particulate matter, plant/stack conditions and/or gases of interest
		1.4	Check that selected sampling/test methods are in accordance with statutory, client or enterprise requirements, relevant standards and guidelines
2	Assist with site liaison	2.1	Liaise with site controller to access site
		2.2	Arrange for induction training, clearances and/or permits, as necessary
		2.3	Clarify site health and safety hazards/risks, safe work procedures/methods and availability of safe work platform
		2.4	Negotiate access to stack during suitable process operating conditions for sampling/testing and to minimise impact on normal operations
		2.5	Negotiate access to site equipment, services, materials and support personnel, as necessary
		2.6	Confirm schedule for stack sampling/testing activities
3	Prepare for stack sampling/testing	3.1	Review site hazards, risks, specified safe work methods

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		3.2	Review approved health and safety plan covering site sampling/testing activities
		3.3	Review sampling/testing procedures and methods and equipment configurations with close attention to the sequence of steps and details for each
		3.4	Select sampling equipment and test instruments and check their operation/calibration in accordance with relevant methods, standards and manufacturer instructions
		3.5	Ensure all conditioning reagents, solutions and calibration gases, as appropriate, are obtained and ready for field use
		3.6	Prepare and store filters appropriate for the likely physical and chemical nature of the gases and particulates and in accordance with sampling/test method
		3.7	Assemble and safely stow all sampling equipment, test instruments, materials, containers and safety equipment
		3.8	Arrange suitable transport to, from and around site as required
4	Assist with site inspection and preliminary tests	4.1	Locate the site controller and re-confirm access and suitability of stack conditions
		4.2	Inspect work platform and check for safe access to existing sampling access holes and electrical services
		4.3	Transport all required equipment and materials to work platform, check they are fit for purpose and rectify, as necessary
		4.4	Record the dimensions of the stack and conduct preliminary determinations of temperature, velocity, pressure and moisture content values using relevant methods
		4.5	Assess suitability/compliance of sampling plane
		4.6	Assess whether the operating environment will

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			impact on safety or reliability of sampling/testing and make modifications or alternative arrangements as directed
		4.7	Confirm numbers of samples, sampling positions and times, sampling/test methods and equipment configurations for sampling and in-situ measurements
5	Conduct sampling and in-situ tests	5.1	Set up sampling/analyser train with appropriate sensors, probes, nozzle, conditioning components and detectors in accordance with method
		5.2	Allow sufficient time for the system to stabilise
		5.3	Calibrate analyser in accordance with test method
		5.4	Operate equipment with close attention to each method step and to maintaining the isokinetic or required sampling/test conditions for each sampling point
		5.5	Conduct regular leak checks, purging and system performance tests in accordance with method to ensure reliable results
		5.6	Carefully collect, label and store each sample to minimise loss or contamination and ensure traceability
		5.7	Accurately record measurements, environmental conditions and any atypical observations that may impact on validity/integrity of samples or test results
6	Finalise stack sampling/testing	6.1	Safely disassemble, clean/decontaminate and restow all equipment and materials for transport to base
		6.2	Transport all samples back to base as soon as practicable and in accordance with enterprise procedures, test methods or relevant standards
		6.3	Ensure all field observations, calibration data, measurements, calculations and results are accurately transferred to enterprise information

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			database
		6.4	Distribute samples for laboratory analysis within specified holding times, if required
7	Process and interpret data	7.1	Review test data noting atypical observations
		7.2	Calculate required quantities using relevant test method and ensure values are consistent with expectations
		7.3	Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required
		7.4	Record processed results in accordance with enterprise procedures
		7.5	Interpret trends in data and/or results and report atypical results promptly to appropriate personnel
		7.6	Determine if obvious procedure or equipment problems have led to atypical data or results
		7.7	Compare results with established air quality standards, statutory environmental quality concentration limits or similar, if relevant
		7.8	Finalise reporting of results in accordance with enterprise requirement
8	Maintain a safe work environment	8.1	Clean all equipment, containers, work area and vehicles according to enterprise procedures
		8.2	Check serviceability of all equipment before storage
		8.3	Use defined safe work practices and personal protective equipment to ensure personal safety and that of others
		8.4	Minimise the generation of wastes and environment impacts
		8.5	Ensure the safe collection of all hazardous wastes for appropriate disposal

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Required Skills and Knowledge

Required skills
Required skills include: • planning and preparing for field activities • communicating effectively with site personnel, and negotiating access and support • observational and descriptive skills • recognising hazards, assessing risks and using appropriate safe work methods/equipment • collecting representative samples of stationary source emissions in accordance with a sampling plan/procedures, standards or instructions • using appropriate techniques to preserve the integrity of samples and transport them safely • demonstrating correct and safe use of stack sampling equipment and analysers, including set-up, pre-use checks, calibration and performance checks • using stack testing equipment/analysers to obtain reliable, quantitative results • identifying and rectifying basic instrument faults • identifying atypical data and samples and taking appropriate action • solving technical problems and responding effectively to changed/unforeseen circumstances • seeking advice when issues/problems are beyond scope of competence/responsibility • maintaining, cleaning, decontaminating sampling equipment • completing accurate records of sampling, test data and results • writing/compiling concise and accurate reports • following requirements for the disposal of waste and the preservation of the environment • working safely
Required knowledge
Required knowledge includes: • specific legislation, policies, standards and codes of practice related to air quality/pollution and monitoring of stationary source emissions • terminology for atmospheric science, sampling and testing of stationary source emissions • properties of air pollutants, such as: • particulates (e.g. inorganics and organics, and metals) • inorganic gases (e.g. CO, CO_2, NO_x, SO_x, ammonia, acid rain and halogens) • volatile organics • localised meteorology and dispersion of air pollutants • ideal gas behaviour, principles of fluid flow through ducts, and effects of bends and orifices • principles of stationary source emissions sampling (particles, common gases and compounds) and associated sampling equipment

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- stack dimensions, source parameters and the selection of sampling planes, number and location of sampling points
- isokinetic conditions, and effect of fluctuations in source parameters on results
- principles of emission monitoring (particles and common gases) and associated analysers
- function of key components, operating principles of common stack sampling/analyser trains
- common procedure/equipment problems leading to atypical data/results
- common process problems leading to atypical test results (e.g. high oxygen readings may indicate a hole in the stack)
- labelling and traceability of samples and management of large volumes of data
- hazards and risks associated with stationary source emissions
- safe work methods and equipment, requirements for safe work platforms and services (e.g. *AS 1657:1992 Fixed platforms, walkways, stairways and ladders - Design, construction and installation*), personal protective equipment, relevant health, safety and environment requirements and procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • demonstrating an understanding of the legislative and regulatory framework for air quality • using accurate terminology to describe air quality parameters and stack sampling/testing • interpreting and applying stack sampling/monitoring plans, sampling/test methods and standards • operating, maintaining and/or calibrating stack sampling and testing equipment to obtain representative stack samples and produce consistently valid and accurate results • interpreting gross features of data, identifying atypical results and making relevant conclusions • calculating results using appropriate units/precision • providing accurate, complete records of sampling and testing observations, data and results

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	• working safely and follow relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSL974003A Perform chemical tests and procedures* • *MSS025009A Perform sampling and testing of air.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • Vehicles, stack sampling/test equipment, analysers, reagents, gases, safety equipment, camera, consumables, logbooks and data loggers, and computers • safety procedures, sampling/test methods, standards and equipment manuals.
Method of assessment	The following assessment methods are suggested: • inspection of stack samples collected by the candidate • review of stack measurements, test results, calculations and observations produced by the candidate • review of sampling/testing records and reports completed by the candidate • feedback from supervisor about the candidate's ability to consistently apply enterprise procedures and work safely • oral and written questioning to check the candidate's understanding of the principles of stack sampling/testing, operation of stack sampling equipment, test instruments/analysers and processing of data • observation of the candidate performing a range of stack sampling and testing tasks. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly.

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	Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS ISO 14050:1999 Environmental management - Vocabulary • AS/NZS ISO 14000 Basic Set:2007 Environmental management basic set • AS 4323.1:1995 Stationary source emissions - Selection of sampling positions • AS 4323.2:1995 Stationary source emissions - Determination of total particulate matter - Isokinetic manual sampling - Gravimetric method • ISO 10780:1994 Stationary source emissions - Measurement of velocity and volume flowrate of gas stream in ducts • US Environmental Protection Authority (EPA)

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	methods, such as: • Method 4 Determination of moisture content in stack gases • Method 7E Determination of nitrogen oxides emissions from stationary sources (instrumental analyser procedure) • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • national environment protection measures • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Information about the site, industrial activities and emissions	Information about the site, industrial processes and emissions may include: • location of site and nearby buildings, topography and meteorological records • complaints, previous stack testing at site or odour assessments in nearby locations • industrial process inputs/outputs, process flowchart, unit operations, batch, cyclic or continuous operation, predictable variations in process conditions, production rates, and period of operation • air emission control systems, such as scrubbers, bag filters, stacks and bio filters • parameters of emission sources, such as location, geometry, release parameters and weather interaction • previous emissions data, such as: • velocity and temperature of pollutant concentration • moisture content • expected gas composition and likely interfering compounds • high vacuum, high pressure and high temperature gas streams • corrosive or very reactive components
Air pollutants	Air pollutants may include: • inorganic gases: • CO and CO_2, NO_x, and SO_x • acid gases • H_2S, HCl

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	• ozone • chlorine, fluorine and fluorides • volatile organic liquids and compounds • particulates: • deposited matter • suspended matter (PM_{10}, $PM_{2.5}$, and PM_1) • particulate fluorides • heavy metals
Stack tests	Stack tests may include, but are not limited to: • measurement of temperature, pressure, velocity and volume flowrate of gas streams • gas analysis for determination of molecular weight • determination of moisture content • determination of particulate matter • determination of concentration of specific gases in emissions (e.g. O_2, CO_2, SO_2, NO and NO_2)
Hazards	Hazards may include: • working on elevated platforms • exposure to toxic, corrosive or hot gases • electrical hazards • trip hazards from cables • noise or heat from plant equipment • objects falling from the work platform or into the duct/stack • flammability hazards
Safety procedures	Safety procedures may include: • preparation/approval of site health and safety plan for sampling/testing, and safe work permits/approvals • use of safe work method statements, site safety induction, risk cards, ‘step back’ and safety checks • use of personal protective equipment • ensuring two persons are present • monitoring of atmosphere for hazardous gases • working upwind of known contaminants • prohibition of eating, drinking and smoking • separation of heavy equipment into smaller units/cases for transport • testing and earthing of electrical services, generators, trip out devices and connectors • shielding of hot surfaces and exhausts • careful handling of glass containers

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	• reporting procedures for safety problems • regular medical checks
Safety equipment	Safety equipment may include: • safety harness, personal protective equipment, such as boots, gloves, safety glasses and overalls • gas monitors • communication equipment (e.g. two-way radio and mobile phone) • MSDS • first aid equipment
Stack sampling and testing equipment	Stack sampling and testing equipment may include: • sampling train with in-stack or out-stack collector and components, such as: • sampling nozzles • probe tubes (e.g. glass and stainless steel) • filters, impingers and desiccators for transport of dry filters • flexible bags (e.g. Tedlar, Mylar and Teflon) • particulate matter collectors, accessories (e.g. cyclones and filter bags) • pre-prepared sample containers (e.g. Dioxin and furans), transport containers, eskies and ice • instruments to measure static and differential pressure (e.g. manometer and barometer) • sampling flow rate control devices • pumps • sampling flow meters • water removal device (e.g. condenser and silica gel) • temperature sensors in stack, duct and gas meters • gas velocity instruments (e.g. pitot tube) • heating/cooling elements to prevent condensation of probe tube or collectors • gas analysers (e.g. NO_x, CO, CO_2, O_2 and N_2) with components, such as: • sample gas manifolds • analyte specific, dual range and low concentration analysers • data recorder, data logger and/or computer for real-time analysis • reagents and standards (e.g. calibration gases, converter efficiency gases, interference checks and demineralised water)

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	• sample lines, hoses, ropes, bags and winches • electrical extension cords • calibrated rod for measuring stack dimensions • balance, timers and digital camera • tools and spare access hole plugs • cherry picker
Sampling/measurement system performance tests	Sampling/measurement system performance checks may include: • detecting and rectifying leaks (or reducing them to acceptable levels) • analyser 2 or 3 point calibration tests • NO_2 to NO conversion efficiency checks • system bias checks • system response time check • interference checks • post-run system bias and zero/span drift checks • quality control (QC) runs
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and consumables, and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027001A Coordinate environmental management activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to coordinate environmental management activities at a site, or within a project, to ensure compliance with relevant legislation, regulations, permits and/or licences. Personnel are required to interpret and explain environmental management policies, plans and procedures to other personnel and apply them to a wide range of activities. This includes recognising potential/actual environmental impacts of current and planned work/recreational activities, implementing and monitoring appropriate preventative and corrective actions to minimise harm to the environment, coordinating response to incidents, liaising with the site personnel and stakeholders, and providing site/project reports. Personnel work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and/or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm environmental management responsibilities	1.1	Interpret legislative, regulatory and licensing requirements and approvals that apply to site/project
		1.2	Clarify own scope of responsibility/authority for achieving specific environmental outcomes for site/project and the roles of other key personnel
		1.3	Identify resources available to implement environmental management policies and plans for site/project
2	Develop and maintain positive relations with site personnel and stakeholders	2.1	Identify significant stakeholders, their relationship to the enterprise and position or perceived attitudes about the site/project
		2.2	Participate in meetings and networks to obtain/maintain knowledge about stakeholders, their representatives and their issues
		2.3	Use appropriate strategies to foster the trust and confidence of site personnel and stakeholder representatives
		2.4	Communicate enterprise positions/requirements in a way that acknowledges concerns of personnel/stakeholders and promotes understanding
		2.5	Respond to requests for information or participation in stakeholder activities in

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			accordance with enterprise procedures
		2.6	Provide timely, authorised information using language, styles and formats that are readily understood
		2.7	Identify difficult situations and negotiate solutions by using a collaborative approach and harnessing cooperation (within scope of responsibility)
		2.8	Obtain regular feedback and use it to maintain and enhance positive relations
3	Provide environmental management information and training	3.1	Use environmental management plans and recent incident reports to identify/review information and training needs of site personnel
		3.2	Access, or develop, information and training programs to meet the identified needs
		3.3	Provide accessible information and training programs to ensure that all site personnel understand their environmental obligations/responsibilities
		3.4	Confirm site personnel's understanding of environmental management actions specified for specific work areas and activities
		3.5	Monitor the effectiveness of information and training and adjust content, format and delivery strategies as appropriate
4	Assess environmental impacts and risks	4.1	Review scheduled activities well in advance to identify implications for environmental management
		4.2	Identify potential/actual events, risks and activities that may cause/have caused harm to the environment
		4.3	Conduct inspections and in-situ measurements to quantify risks and impacts
		4.4	Report assessment of risks and impacts in accordance with enterprise/legislative

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			requirements
5	Ensure environmental monitoring and management plans are implemented	5.1	Conduct specified environmental monitoring and site inspections to check performance against environmental management requirements
		5.2	Ensure that enterprise environmental monitoring instruments are fully functioning and maintained appropriately
		5.3	Conduct additional monitoring/inspections after atypical events, legitimate complaints or government requests to assess whether environmental management plan is operating effectively
		5.4	Examine results of in-situ measurements, laboratory analyses, inspections and audits to identify significant trends, non-conformance and/or incidents
6	Respond to environmental non-conformances and incidents	6.1	Recognise unusual situations, unexpected risks/hazards and potential/actual environmental incidents
		6.2	Implement enterprise procedures for responding to environmental non-conformance and incidents to ensure prompt control and remediation
		6.3	Investigate the causes of non conformances and incidents within scope of responsibility and in accordance with enterprise/legislative requirements
		6.4	Analyse findings to identify opportunities to re-design activities, work practices, environmental controls, information/training programs and/or management procedures
		6.5	Implement authorised corrective/preventative actions to prevent recurrence of non-conformance/incident and to reduce risks
		6.6	Record all recommendations, actions and outcomes in accordance with the

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			enterprise/legislative requirements
7	Keep management informed about environmental performance	7.1	Provide regular reports about environmental performance, instances of potential/actual non-conformance and incidents and the actions taken in each case
		7.2	Report opportunities and recommendations for improvements in accordance with enterprise procedures
		7.3	Seek manager's advice when challenges are beyond own scope of responsibility/technical competence or when input from environmental specialists may be required
8	Maintain environmental records	8.1	Ensure all required records are legible, accurate and satisfy enterprise/legislative requirements
		8.2	Store environmental records to enable easy access and review by authorised personnel according to enterprise procedures
		8.3	Regularly review and assess environmental records to identify significant trends and impacts
		8.4	Identify any problems with the maintenance and security of records and resolve them promptly

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes, guidelines and manuals • regularly (re)assessing site/project environmental risks and impacts • monitoring the implementation of environmental management plans, policy and procedures, and specified work methods • analysing site/project environmental data, and verifying and reporting results • developing and maintaining a range of useful contacts and networks

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• consulting and communicating with a wide range of people about environmental issues • clearly explaining environmental management concepts, principles and procedures to others • responding effectively to complaints and requests for information • resolving issues/conflicts constructively with site personnel and stakeholders • solving complex technical problems • seeking advice when issues/problems are beyond scope of competence/responsibility • providing accurate, complete and timely reports, briefings and handovers • maintaining records • working safely and monitoring the safety of others
Required knowledge
Required knowledge includes: • environmental protection/management terminology, concepts and principles • site/project characteristics, nature of activities conducted at site, environmental management values, environmental issues, and risks and impacts • environmental legislative/regulatory requirements and responsibilities relevant to site/project • enterprise environmental management plans, procedures, control measures and management actions for site/project • enterprise procedures for identifying assessing environmental risks and impacts, managing stakeholder relations, responding to complaints, cultural/heritage finds and other environmental incidents, and record management and reporting • interpersonal communication, negotiation and conflict resolution techniques • problem-solving techniques • relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • gathering and interpreting environmental management information relevant to site/project • explaining environmental management information

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	clearly to site personnel • collecting, analysing and reporting environmental data • monitoring effective implementation of site/project environmental management plans • assessing environmental risks and impacts arising from site/project activities • recognising, investigating and rectifying environmental management issues within scope of responsibility • keeping management fully informed about site/project environmental performance and issues • maintaining site/project environmental records in accordance with legislative/licensing/enterprise requirements.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027002A Apply environmental legislation, codes and standards* • *other MSS027000 series units dealing with specific environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history • relevant legislation, codes, standards, enterprise environmental management policies, plans, actions, procedures and checklists • physical resources required for coordination activities, such as maps, laptop computer, digital camera, and monitoring and sampling equipment.
Method of assessment	The following assessment methods are suggested: • review of environmental monitoring results, records, and reports generated by the candidate • review of environmental information developed by the candidate • feedback from peers, managers and/or stakeholder representatives that the candidate is able to safely

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	coordinate environmental management activities for site/project • oral/written tests involving environmental management terms, principles and quantities; set-up, calibration and basic maintenance of monitoring equipment; selection and use of safety equipment and personal protective equipment • analysis of case studies/reports of relevant environmental management issues and incidents • observation of the candidate representing the enterprise at stakeholder meetings or providing environmental management information and instruction to other personnel. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations

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	and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • environmental management plan, site information about applicable legislative requirements and approval requirements • information about site processes, work schedules • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures and work method statements • material safety data sheets (MSDS)
Environmental information and training	**Environmental information and/or training** may include: • enterprise environmental management policy • content and purpose site/project environmental management plan • legislative responsibilities • licensing/permit/compliance requirements • due diligence and duty to notify • lines of communication • introduction to site/project and environmental considerations, and sources of environmental information • environmental management actions and checklists, methods/procedures for specific activities • incident management and reporting

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Provision of environmental information and training	Provision of environmental information and training may include: • site induction (environmental component) • task specific training (e.g. spill management) • toolbox talks (regular, 'as required' and topic specific) • daily, pre-start meetings with supervisors/team leaders about specific issues (e.g. hazards and working in close proximity to known fauna habitats) • posters and reading materials displayed in common areas and noticeboards • supervisor notices and daily bulletins about specific environmental issues • response to community complaints
Site personnel and stakeholders	Site personnel and stakeholders may include: • enterprise employees • contractors and subcontractors • consultants, such as environmental scientists, planners, engineers and external auditors • suppliers and service providers • community representatives and landowners • visitors or members of the public • government/regulator representatives and inspectors
Reports	Reports may include: • non-conformance report form • hazard near miss report form • site/project incident investigation report • weekly environmental report • monthly environmental report • regulatory agency reports (where required by permit, approval or licence conditions)
Site/project records	Site/project records may include: • digital photographs • environmental monitoring data • internal quality/environmental audit reports • records required by permit, approval or licence conditions • records of training • records of monitoring equipment purchase, calibration, inspection, maintenance and service • records of complaints and government requests

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	• records of environmental non-conformances, incidents or significant impacts • contractor and supplier information • electronic/hard copy correspondence • records of approved expenditure and orders
Environmental issues and incidents	Environmental issues and incidents may include: • finding or disturbing an actual/potential cultural heritage item or site • community or stakeholder complaint • failure of erosion or sediment controls • spill or release of chemical, hydrocarbon or other hazardous material • decline in water quality due to site/project activities • decline in air quality due to dust, SO_x and NO_x • unacceptable noise levels • environmental harm to protected habitat or species • transport of prohibited materials to/from site (e.g. pests, weeds and contamination)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027002A Apply environmental legislation, codes and standards

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to interpret and apply the environmental legislation, codes and standards that are relevant to the work area, site, project or program. Personnel are required to access, review and interpret complex legal and technical documents; develop site or project-specific environmental management procedures if required, explain the implications of these documents to site personnel, monitor work activities to ensure compliance, and to prepare reports. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager. Note that the ability to respond to environmental non-conformances and incidents is covered in *MSS027001A Coordinate environmental management activities.*

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water, waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Access and interpret relevant legislation, codes and standards	1.1	Review legislative, regulatory and licensing requirements and approvals that apply to site/project
		1.2	Analyse the broad significance of these requirements for the enterprise, key job roles and specific work activities
		1.3	Identify legal accountability, obligations and consequences of non-compliance
		1.4	Obtain advice from appropriate personnel about environmental law matters that impact on work area and are outside own scope of knowledge
		1.5	Clarify own scope of responsibility/authority for achieving specific environmental outcomes
2	Ensure project or site specific environmental management procedures comply with requirements	2.1	Review relevant enterprise environmental management policies, plans and procedures in conjunction with legislative requirements
		2.2	Assess the need for project or site-specific environmental management procedures in consultation with manager
		2.3	Draft new or revised procedures to address any gaps or deficiencies
		2.4	Provide draft documentation to appropriate personnel for review and/or approval prior to use

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3	Promote compliance by site personnel	3.1	Distribute clear information about the environmental management roles and responsibilities of site personnel
		3.2	Provide clear information about enterprise environmental management policies, plans and procedures and work instructions
		3.3	Explain the implications of non-compliance to all site personnel in work area
		3.4	Empower site personnel through coaching and mentoring to manage their own environmental responsibilities
4	Ensure that work activities meet compliance requirements	4.1	Plan work activities to ensure environmental compliance
		4.2	Recognise when current or planned activities may require changes to existing licences/approvals and notify appropriate personnel
		4.3	Implement environmental management policies, plans and procedures to ensure compliance and achieve environmental objectives and key performance indicators
		4.4	Collect and collate environmental data to support preparation of required reports and compliance information
		4.5	Review environmental data for completeness/accuracy and identify opportunities for improving compliance
		4.6	Complete reporting requirements in accordance with enterprise procedures and legislative requirements
5	Maintain knowledge of legislative requirements	5.1	Monitor sources of information for changes to relevant legislation codes and standards
		5.2	Regularly update information for site personnel and explain changes to legal requirements that

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impact on work area

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes and guidelines • analysing and reviewing enterprise environmental management plans, policies, procedures and work instructions for legislative compliance • writing site, or project-specific environmental management procedures and/or work instructions in plain English • clearly explaining environmental management concepts, principles and procedures to others • monitoring the implementation of environmental management plans, policy and procedures, and work instructions by site personnel • analysing site/project environmental data and compliance information, and verifying and reporting results • seeking advice when issues/problems are beyond scope of competence/responsibility • providing accurate, complete and timely reports • maintaining compliance records
Required knowledge
Required knowledge includes: • common legal terminology, such as statute, acts, regulations and ordinances • common sources of environmental legal information • relevant responsible bodies at federal and state/territory levels • major features of federal and state/territory environmental legislation, regulations and local government by-laws, policies and plans that apply to the site, project or program • enterprise environmental management plans, policies, procedures and work instructions that apply to the site, project or program • enterprise procedures for the development, revision and improvement of environmental management policies, plans, procedures and work instructions • enterprise environmental reporting requirements for the site, project or program and reporting procedures

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • researching, interpreting and applying relevant environmental legislative requirements, codes and standards to the site, project or program activities • explaining environmental management roles, responsibilities, obligations and compliance requirements to site personnel • writing clear and concise site or project-specific environmental management procedures or work instructions • monitoring and promoting environmental compliance in work area • identifying opportunities for improving compliance in work area • keeping up-to-date with changes in compliance requirements for the site, project or program.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027001A Coordinate environmental management activities* • *other MSS027000 series units dealing with specific environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project history • relevant legislation, codes, standards, enterprise environmental management policies, plans, actions, procedures and checklists • laptop computer and access to enterprise information

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	management system.
Method of assessment	The following assessment methods are suggested: • review of environmental records and reports generated by the candidate • review of environmental information developed by the candidate and provided to site personnel • feedback from peers and managers that the candidate is able to consistently apply relevant environmental compliance requirements to site/project/program activities • oral/written tests involving compliance requirements and environmental management terms, principles and procedures • analysis of case studies/reports of relevant environmental compliance issues • observation of the candidate providing environmental management information and instruction to other personnel. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise	**Legislation, standards, codes, procedures and/or enterprise requirements may include:**

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requirements	• federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice • Australian Dangerous Goods Code ADG7 • occupational health and safety (OHS) national standards and codes of practice • environmental management plans, policies and procedures • site information about applicable legislative requirements and approval requirements • information about site processes, work schedules • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures and work method statements • material safety data sheets (MSDS)
Major features of legislation, codes and standards	Major features of legislation, codes and standards may include: • scope of application, objectives and policies

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	• assessment procedures • works approval procedures • permits • regulation of activities • licensing procedures, terms and conditions • environment protection notices, offences and penalties • notification requirements • auditing requirements • powers of investigation • courts, enforcement provisions and sentencing options
Site personnel	Site personnel may include: • enterprise employees • contractors and subcontractors • consultants, such as environmental scientists, planners, engineers and external auditors • suppliers and service providers • government/regulator representatives and inspectors • visitors, members of the public, community representatives and landowners
Reports	Reports may include: • weekly environmental reports • monthly environmental reports • regulatory agency reports as required by permit, approval or licence conditions
Sources of information about changes to legislative requirements	Sources of information about changes to legislative requirements may include: • Environmental Defenders Office (EDO) Network • Australasian Legal Information Institute • industry forums • compliance reports • government/industry newsletters • industry journals • information updates from regulatory authorities • websites
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be

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	compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027003A Provide environmental advice to clients

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to provide verbal or written advice to clients about environmental issues, problems or aspects of environmental management plans, policies and procedures that are relevant to a specific site, project or program. Personnel are required to identify and analyse the issue or problem, source relevant information, formulate advice from a range of options and communicate the authorised advice clearly to the client. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Develop and maintain specialist environmental knowledge	1.1	Build a comprehensive knowledge and understanding of relevant environmental issues through networking and researching examples of environmental management best practice
		1.2	Collate and store information in accordance with enterprise requirements
		1.3	Apply acquired information to improve the quality of work outputs
2	Define and analyse the request for advice	2.1	Confirm and record the source, nature and priority of the client request
		2.2	Clarify the issue/problem/requested information and analyse the risks involved with providing advice
		2.3	Clarify enterprise communication protocols and redirect the request to a more relevant person, if appropriate
		2.4	Seek guidance from relevant personnel, as necessary
3	Gather and analyse relevant information	3.1	Identify the information required to formulate useful advice
		3.2	Identify available sources of information that are relevant and reliable
		3.3	Obtain external expert opinion and advice in accordance with enterprise procedures, if required

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		3.4	Analyse available information to identify issues, principles, legal requirements, patterns and/or trends in data that are of interest to the client
4	Formulate advice	4.1	Develop advice options that are based on clear legislative requirements and/or sound environmental management practices
		4.2	Clearly distinguish between fact and opinion
		4.3	Justify any assumptions made and support conclusions with reasoned arguments and appropriate evidence
		4.4	If necessary, discuss options with client and/or relevant personnel, incorporate their feedback and finalise advice
		4.5	Ensure that advice is accurate and meets the client's needs
		4.6	Obtain authorisation to release advice to client in accordance with enterprise communication protocols
5	Communicate advice to client	5.1	Provide timely, authorised advice in accordance with enterprise policies/procedures and in a format/manner that suits the client
		5.2	Check and confirm client's understanding of the advice provided
		5.3	Use feedback from clients to improve the way advice is developed and provided
6	Record details of the request and advice	6.1	Record accurate details of request, client contact and advice in accordance with enterprise procedures
		6.2	File records in accordance with enterprise procedures

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Required Skills and Knowledge

Required skills
Required skills include: • applying enterprise procedures and communication protocols when providing environmental advice to clients, identifying and assessing the risks involved • analysing and prioritising client requests for environmental advice • locating, analysing and synthesising relevant information from a range of sources • taking notes, summarising and organising environmental information in a logical sequence • explaining complex environmental management concepts, principles and procedures and legislative/regulatory requirements clearly • listening actively and asking questions to clarify a client's understanding • formulating advice that is accurate, valid and meets the client's needs • presenting environmental advice using a format, style and language that suits the client and is in accordance with enterprise requirements • providing and receiving constructive feedback • seeking advice when issues/problems are beyond scope of competence/responsibility • maintaining security/confidentiality of information in accordance with enterprise procedures • maintaining records
Required knowledge
Required knowledge includes: • common sources of environmental information relevant to job role • environmental protection/management terminology, concepts and principles • environmental legislative/regulatory requirements and responsibilities relevant to site/project/program • enterprise environmental management plans, procedures, control measures and management actions for site/project/program • site/project/program characteristics, nature of activities conducted at site, environmental management values, environmental issues, risks and impacts • enterprise procedures for identifying assessing environmental risks and impacts, managing client relations, responding to complaints, cultural/heritage finds and other environmental incidents, and record management and reporting

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • describing actions taken to develop and maintain their specialist environmental knowledge • following enterprise procedures for providing environmental advice to clients • obtaining and analysing sufficient information to formulate environmental advice that is accurate, up-to-date and meets the client's needs • providing authorised information using language, style and format that is readily understood • communicating advice within the expected timeframe and confirming the client's understanding • obtaining and using feedback to improve the provision of environmental advice to clients.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027001A Coordinate environmental management activities* • *other MSS027000 series units dealing with specific environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, procedures and checklists • access to a computer, internet, data sets, enterprise reports, published case studies and research.

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Method of assessment	The following assessment methods are suggested: • review of environmental advice and the supporting documentation prepared by the candidate for a range of clients • feedback from manager and clients that the candidate consistently provides timely advice that meets their needs • oral/written tests involving environmental management terms and principles, legislative/regulatory requirements, enterprise environmental management plans, policies and procedures • analysis of case studies requiring advice about issues/problems within scope of responsibility • observation of the candidate presenting advice to clients. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity

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	Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • environmental management plan, site information about applicable legislative requirements and approval requirements • information about site processes and work schedules • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures and work method statements • material safety data sheets (MSDS)
Environmental issues and problems	**Environmental issues and problems may include:** • identifying and addressing cultural heritage issues • managing site amenity and access issues • designing/conducting environmental monitoring baseline studies and social risk/impact assessments • managing expectations and addressing community concerns about impacts, community development and local employment opportunities • responding to community or stakeholder complaints • responding to environmental exceedances (e.g. noise, dust and water quality) and adverse audit findings

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	• investigating/responding to environmental non-conformance, non-compliance and incidents • informing interested parties about changes to site/project/program operations • involving interested parties in site/project/program closure planning • developing and coordinating a site rehabilitation program • developing environmental management strategies (e.g. for water use, wastewater, energy, waste and sustainability)
Information	Information may include: • legislation, regulations, guidelines, standards, codes of practice, licence conditions and approval processes • environmental management case studies, research findings and models of good practice • enterprise environmental management plans, policies, strategies and procedures • site/project initial advice statements and risk/impact assessments • records of site consultations with interested parties • site/project environmental reports (e.g. weekly and monthly monitoring) • environmental data sets, such as • satellite imagery and remote sensing data • geophysical, geochemical, geological, hydrological and meteorological data • ecological data, such as distribution of vegetation, fauna and pests • social science data, such as demographic and census information • land use data, zoning and property classifications • historical records and photographs • community surveys • maps (road and topographical) and aerial photos • site utilities/services (e.g. water, sewer, electricity and gas) • government reports • articles (e.g. online, academic, newspaper and journal)
Sources of information	Sources of information may include: • government departments and agencies (e.g. environment, climate change, agriculture and mining)

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	• regulatory authorities • universities, cooperative research centres • utility authorities/companies (e.g. water, gas and electricity) • land title office and Valuer General • local government records • Geoscience Australia • Australian Social Science Data Archive • companies providing environmental services • internet, library/archive collections, annual reports and community newsletters
External expert opinion	External expert opinion may include: • government regulators • environmental consultants • contractors • solicitors • environmental scientists, engineers and planners • professional groups and organisations • community leaders tribal elders
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

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Custom Content Section

Not applicable.

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MSS027004A Contribute to environmental decision making

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to gather and analyse information about environmental issues to inform enterprise decision making and to make valid decisions within a defined scope of responsibility. Personnel are required to implement relevant enterprise policies/procedures, consult with and involve interested parties, develop well researched positions, make decisions and/or provide sound recommendations for consideration by decision makers, and to inform others about decisions. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors. such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm decision-making process with manager	1.1	Identify site/project/program environmental issues or problems that require decisions
		1.2	Examine enterprise environmental policies/procedures to identify the relevant decision maker and decision-making process
		1.3	Scope the issue or problem, context, possible causes, the needs/concerns of interested parties and the risks involved
		1.4	Seek timely advice about issues/problems/decisions that have impacts beyond own scope of responsibility
		1.5	Confirm own role in the decision-making process and the timeline, constraints and resources available
2	Identify information needs, sources and collection methods	2.1	Identify the information required for a reliable decision
		2.2	Confirm that available sources of information are reliable and sufficiently comprehensive for the required context
		2.3	Select information collection methods that are efficient, cost-effective and ethical
		2.4	Seek external expert opinion and advice in accordance with enterprise procedures, if required
3	Engage interested parties to inform	3.1	Identify interested parties; their respective interests, needs and expectations; and assess their

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	decision making		ability to contribute
		3.2	Identify appropriate engagement strategies/activities to encourage effective participation in the decision-making process
		3.3	Explain the engagement objectives and constraints and the level of influence that participants have on decisions
		3.4	Use active listening to seek input and a balanced exchange of views
		3.5	Provide accurate and balanced information using a language, style and format that is readily understood
		3.6	Acknowledge differences of opinion to encourage rigorous examination of all options
		3.7	Seek feedback to ensure that the views expressed by all participants have been understood
		3.8	Keep interested parties informed about engagement outcomes and progress of decision making
4	Gather and analyse information needed for decision making	4.1	Gather sufficient information using methods that comply with enterprise policies/procedures and legislative requirements
		4.2	Ensure objectives for analysis are clear and appropriate for the required decisions
		4.3	Analyse available information to identify significant issues, principles, legal requirements, patterns and/or trends
		4.4	Clearly distinguish between fact and opinion
		4.5	Justify assumptions made and support conclusions with reasoned arguments and appropriate evidence
		4.6	Record outcomes of analysis in sufficient detail to enable transparent decision making

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5	Make decisions and/or provide recommendations	5.1	Consider feasible options for addressing the issue/problem and the associated risks, costs and benefits of each
		5.2	Check that the preferred option complies with legislative requirements and enterprise policies/procedures
		5.3	Obtain advice from relevant personnel if unsure about decisions or draft recommendations
		5.4	Make valid, timely decisions when issue/problem is within own scope of responsibility
		5.5	Provide recommendations to relevant personnel in time to inform decision making and enable effective action to be taken
6	Communicate information and decisions	6.1	Provide timely, authorised information in accordance with enterprise policies/procedures and in a form/manner that suits the needs of recipients
		6.2	Check and confirm recipients' understanding of the information provided
		6.3	Use feedback from recipients to improve the way information is provided
7	Review contribution to decision-making process	7.1	Review information collection strategies, engagement activities and contribution to decision-making process to identify opportunities for improvement
		7.2	Report findings to relevant personnel

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Required Skills and Knowledge

Required skills

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Required skills include:

- accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes, guidelines and manuals
- implementing environmental management plans, policy and procedures relating to community engagement, communication protocols and decision making
- developing and maintaining a range of useful contacts and networks
- responding effectively to complaints and requests for information
- explaining environmental management concepts, principles and procedures clearly
- gathering, analysing and summarising environmental information
- listening actively, asking questions and clarifying points to reach mutual understanding
- encouraging participation and audience feedback
- adapting communication style, language and media to suit audience
- drawing logical, evidence-based conclusions
- making valid decisions and preparing sound recommendations
- resolving differences of opinion/conflicts constructively
- seeking advice when issues/problems are beyond scope of competence/responsibility
- providing accurate, complete and timely reports, briefings and handovers

Required knowledge

Required knowledge includes:

- environmental protection/management terminology, concepts and principles
- site/project characteristics, nature of activities conducted at site, environmental management values, environmental issues, risks and impacts
- environmental legislative/regulatory requirements, approvals, permits, licences and responsibilities relevant to site/project
- risk/impact assessments, enterprise environmental management plans, procedures, control measures and management actions for site/project
- enterprise procedures for engaging interested parties, managing stakeholder relations, responding to complaints and requests for information, and record management and reporting
- good practice models for community engagement and environmental decision making
- interpersonal communication, negotiating/lobbying/influencing/conflict resolution techniques
- problem-solving techniques
- relevant health, safety and workplace emergency response procedures

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Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • applying enterprise decision-making procedures • identifying and obtaining sufficient information to make valid decisions and/or sound recommendations • consulting effectively with interested parties and keeping them informed about the decision-making process • analysing information rigorously to provide a reliable basis for informed decision making • making decisions and/or providing recommendations in sufficient time to inform decision making and enable effective action to be taken • communicating decisions clearly.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027001A Coordinate environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, procedures and checklists • access to a computer, internet, maps, data sets, enterprise reports, published case studies and research.
Method of assessment	The following assessment methods are suggested: • review of environmental decisions and/or

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	recommendations made and the supporting documentation provided by the candidate • review of information developed by the candidate about the issue/problem for interested parties • feedback from managers and/or stakeholder representatives that the candidate is able to contribute effectively to environmental decision making within scope of responsibility • oral/written tests involving environmental management terms, principles and procedures, enterprise procedures and strategies for community engagement and decision making, and techniques for analysing information • analysis of case studies involving issues/problems within scope of responsibility • observation of the candidate representing the enterprise to interested parties and collecting or providing information. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as:

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	• Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • environmental management plan, site information about applicable legislative requirements and approval requirements • information about community engagement, management of stakeholder relations and communication protocols • information about site processes and work schedules • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • procedures for emergency preparedness and response
Environmental issues and problems	**Environmental issues and problems may include:** • developing/negotiating land use and other site agreements, including making changes to these • identifying and addressing cultural heritage issues • managing site amenity and access issues • designing/conducting environmental monitoring baseline studies and social risk/impact assessments • managing expectations and addressing community concerns about impacts, community development and local employment opportunities • responding to community or stakeholder complaints • responding to environmental exceedances (e.g. noise, dust and water quality) and adverse audit findings

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	• investigating/responding to environmental incidents or adverse audit findings • informing interested parties about changes to site/project operations • involving interested parties in site/project closure planning • developing a site rehabilitation program
Information	Information may include: • legislation, regulations, guidelines, standards, codes of practice, licence conditions and approval processes • environmental management case studies, research findings and models of good practice • enterprise environmental management policies and procedures • site/project initial advice statements, risk/impact assessments and environmental management plans • records of site consultations with interested parties • site/project environmental reports (e.g. weekly and monthly monitoring) • environmental data sets, such as • satellite imagery and remote sensing data • geophysical, geochemical, geological, hydrological and meteorological data • ecological data, such as distribution of vegetation, fauna and pests • social science data, such as demographic and census information • land use data, zoning and property classifications • historical records and photographs • community surveys • maps (road and topographical) and aerial photos • site utilities/services (e.g. water, sewer, electricity and gas)
Sources of information	Sources of information may include: • government departments and agencies (e.g. environment, climate change, agriculture, mining and land use/planning) • utility authorities/companies (e.g. water, gas and electricity) • land title office and Valuer General • local government records • Geoscience Australia • Australian Social Science Data Archive

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	• companies providing environmental services • internet, library/archive collections, annual reports and community newsletters
Information collection methods	Information collection methods may include: • accessing external publications • conducting internet searches • accessing enterprise files and reports • conducting interviews with enterprise personnel, government representatives and interested parties • consulting with external experts • holding discussion groups, learning circles, workshops, reference groups and community consultative committees • conducting community/stakeholder surveys
External expert opinion	External expert opinion may include: • government regulators • environmental consultants • contractors • solicitors • environmental scientists, engineers and planners • professional groups and organisations • community leaders, tribal elders and traditional owners
Strategies and activities to encourage effective participation in decision making	Strategies and activities to encourage effective participation in decision making may include: • one-on-one informal or impromptu discussions • formal interviews • regular briefings • public meetings, focus groups and workshops • a site/project visitor centre, open days and site visits • hotline or 24 hour contact numbers to record issues or complaints • websites • direct mail or newsletters • links with community liaison or advisory groups • translation of key information into local languages
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be

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	compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027005A Contribute to improving environmental performance

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to perform activities associated with the review or internal audit of the environmental performance of an enterprise. Personnel will work under the guidance of a manager or a lead auditor and the scope of activities performed will depend on their job role, the size of the enterprise, and complexity of its environmental management system (EMS) and auditing requirements. They also work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Plan review/audit activities with manager or lead auditor	1.1	Review legislative and/or regulatory compliance requirements and relevant enterprise policies and procedures
		1.2	Clarify objectives and scope of the activities planned together with the risks, constraints and resources available
		1.3	Clarify site, sections, work areas, functions and/or practices to be reviewed/audited
		1.4	Confirm own role and responsibility for specific review/audit tasks
		1.5	Plan the review/audit activities to minimise workplace disruption and ensure they can be safely conducted within agreed time intervals/timeframes
2	Prepare for assigned review/audit activities	2.1	Gather background information relevant to site, sections, work areas, functions and/or practices to be reviewed/audited
		2.2	Scrutinise the relevant review/audit criteria, tools and evidence requirements to enhance own objectivity and attention to detail
		2.3	Identify any technical and equipment requirements for review/audit and if support personnel are required
		2.4	Inform all personnel involved and arrange meetings or appointments, as necessary

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3	Conduct assigned review/audit activities	3.1	Collect a representative sample of site documentation
		3.2	Collect sufficient information from observations and interviews to provide reliable evidence of environmental performance
		3.3	Work cooperatively with personnel to maximise their ownership of the review/audit and identify opportunities to improve environmental performance
		3.4	Keep accurate records of observations and interview responses
4	Analyse information and evaluate performance	4.1	Analyse information to identify significant performance trends, patterns, gaps and areas of risk
		4.2	Recognise instances of non-conformance/non-compliance and identify options for improving performance
		4.3	Evaluate performance against specified benchmarks and support conclusions with appropriate evidence
		4.4	Seek manager or lead auditor’s advice when issues or problems are beyond own scope of responsibility/competence or when input from environmental specialists may be required
5	Report review/audit results	5.1	Document results in accordance with relevant standard/enterprise procedures and compare with initial objectives
		5.2	Confirm results with manager/lead auditor
		5.3	Report results to appropriate personnel for action in accordance with enterprise procedures

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Required Skills and Knowledge

Required skills
Required skills include: • interpreting legislative/regulatory requirements and relevant audit standards, policies, procedures and plans • planning, organising and evaluating environmental review/audit activities • clearly explaining environmental performance requirements and review/audit procedures • communicating effectively with site personnel and encouraging their active participation • working systematically, with close attention to detail • analysing information and drawing logical, evidence-based conclusions • clearly documenting results, required actions and options for improvements • seeking advice when issues/problems are beyond scope of competence/responsibility • providing accurate, complete and timely reports and briefings • recognising hazards, assessing risks and working safely
Required knowledge
Required knowledge includes: • environmental protection/management/audit terminology, concepts, principles and relevant examples of best practice • legislative/regulatory requirements and compliance strategies • key aspects of enterprise environmental management systems/policies/procedures/plans • procedures for conducting environmental performance review/audit activities • procedures for site sampling, environmental monitoring and testing and reporting of results • hazards and risks relevant to review/audit activities and specified control measures • correct use of review/audit tools (e.g. performance criteria, checklists and benchmarks) • common examples of environmental non-conformance/non-compliance, and corrective/preventative actions and strategies for improving environmental performance • common issues and problems that may arise when conducting environmental review/audit activities and the recommended actions in each case • relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.

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Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • following relevant standards and/or enterprise procedures for review/audit activities • consulting effectively with interested parties and keeping them informed about the review/audit process • obtaining sufficient information to draw valid conclusions about environmental performance and providing sound recommendations • providing clear, timely reports that enable effective action to be taken.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027001A Coordinate environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • background information for site • current site documentation • relevant legislation, codes, standards, enterprise environmental management policies, plans and procedures • enterprise review/audit procedures and tools • access to site personnel • access to a computer, internet, enterprise reports, published case studies and research.
Method of assessment	The following assessment methods are suggested: • review of results of review/audit activities and the supporting documentation prepared by the candidate • feedback from site personnel, lead auditor or manager that the candidate follows relevant audit standards and procedures

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	• oral/written tests involving environmental management terms, principles and quantities, and enterprise procedures for review/audit activities • analysis of case studies involving environmental performance issues/problems within scope of responsibility • observation of the candidate interacting with site personnel during review/audit activities. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection

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	• cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • AS/NZS ISO 19011:2003 Guidelines for quality and/or environmental management systems auditing • EMS, site plan and information about applicable legislative requirements and approval requirements • information about site processes and work schedules • information about emergency preparedness and response • monitoring procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures and work method statements
Scope of review/audit activities	Scope of review/audit activities may include: • components of an initial environmental review (IER) prior to establishing an EMS • periodic inspection against environmental management plan requirements for: • monitoring and measurement • materials and energy usage • materials storage and handling, and spills • wastewater management • air emissions management • noise management • chemical waste management • solid waste management • scheduled review/internal audit of site, section, function or work area • scheduled review/ internal audit of components of an enterprise EMS, such as: • non-conformity, corrective/preventative actions • competence, training and awareness programs • control of records

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	• supplier or contractor performance • emergency preparedness and response • adequacy of environmental management for new or changed operations, processes and work activities • investigation of a complaint, environmental incident or suggested improvements
Information	Information may include: • enterprise environmental management policies, procedures, plans and actions • enterprise work instructions • background information, such as: • previous internal review/audit reports • previous external audit reports • records of complaints, incidents, non-conformance/non-compliance and the corrective and/or preventative actions taken • site documentation, such as: • minutes of meetings • log books, records of environmental monitoring and test results, and regular performance reports • records of equipment use, calibration and maintenance • records of training • instructions for contractors and suppliers • external reports (e.g. external experts and regulator) • records of observations, inspections and interviews
Review/audit results	Review/audit results may include: • observations • findings • examples of best practice • non-conformances/non-compliances with options for corrective and preventative actions, and improvements
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied

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	• where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027006A Coordinate water quality management activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to oversee the day-to-day water quality management activities for a site, project or an ongoing program. Personnel are required to interpret and implement a water quality management plan, organise specified management activities, verify the quality of monitoring data and investigate and rectify unexpected or unacceptable results, monitor compliance with relevant water quality objectives or standards, and provide reports. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental services involved with sampling, monitoring and/or management of surface water, groundwater, stormwater or wetlands
- environmental compliance, auditing and inspection.

Note that the term ‘manager’ is used to refer to management of a function, project and/or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS024006A Perform sampling and testing of water

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm scope of water quality management activities with manager	1.1	Review legislative, regulatory and licensing requirements and approvals that apply to site/project/program
		1.2	Review current water quality management plan, including objectives, known issues, specified management activities and any required changes
		1.3	Review previous water quality records and reports, if available
		1.4	Confirm that water quality monitoring sites, sampling and measurement methods, instrumentation and enterprise procedures are in accordance with relevant standards and guidelines
		1.5	Clarify own scope of responsibility/authority for achieving specific outcomes and the roles of other key personnel
		1.6	Identify resources available to conduct water quality management activities
2	Organise water quality management activities	2.1	Develop a consolidated schedule to ensure all activities can be conducted efficiently with the available resources
		2.2	Develop checklists/clear work instructions to enable personnel to perform assigned tasks efficiently and with minimal errors
		2.3	Ensure that personnel who conduct monitoring and/or collect water samples are competent to undertake their assigned tasks
		2.4	Ensure water quality monitoring equipment is regularly calibrated and maintained and that adequate stocks of consumables are available
		2.5	Ensure water samples are handled in accordance with the sampling method and chain of custody

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			requirements and dispatched promptly for analysis
		2.6	Conduct, or arrange for, regular site inspections to monitor the effectiveness of water quality management actions (if relevant to site/project/program)
		2.7	Advise relevant personnel when specified water quality management actions are not being implemented effectively (if relevant to site/project/program)
		2.8	Conduct, or arrange for, additional monitoring/inspections after atypical events, legitimate complaints or government requests
3	Verify water quality data	3.1	Identify relevant job instructions, data and technical records in enterprise information management system
		3.2	Confirm that technical records provide sufficient information to ensure traceability/chain of custody for the monitoring activities involved
		3.3	Compare monitoring data with expected values and identify any outliers
		3.4	Inspect data records to identify any gaps and to check the integrity of data entry, transfers, alterations and calculations
		3.5	Notify manager when data is incomplete or contains significant errors, and clarify what action to take
4	Determine if results are acceptable and within expectation	4.1	Compare results with expected and/or relevant guideline values and identify any significant differences or trends
		4.2	Check the reliability of results by examining data or results from repeat measurements and/or tests of duplicate samples or other monitoring stations
		4.3	Assess the significance of any recorded observations of atypical environmental or

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			meteorological conditions
		4.4	Check that all calculations are free from error
		4.5	Check that estimations of uncertainty are reasonable and consistent with the sampling method and relevant guidelines, if relevant
		4.6	Report results that meet enterprise data quality standards and are consistent with expectations
5	Investigate/rectify unexpected or unacceptable results	5.1	Examine records of pre-use checks and calibration performance to ensure that the sampling equipment and/or monitoring/test instruments used meet specifications and enterprise requirements
		5.2	Establish whether human, environmental and/or meteorological factors could have affected the reliability of results
		5.3	Check for obvious sources of interference that may have occurred during measurements or analysis of samples
		5.4	Retrieve stored samples (if available) and assess whether they are atypical or contaminated
		5.5	Arrange for control tests using the same or new samples to check unexpected results, if relevant
		5.6	Report unexpected results that meet enterprise data quality standards
		5.7	Identify possible root causes of unacceptable results and appropriate preventative/corrective actions
		5.8	Report investigation outcomes and recommendations for improvements in accordance with enterprise procedures
		5.9	Seek manager’s advice when challenges are beyond own technical competence or when input from environmental specialists may be required

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6	Keep management informed about water quality performance	6.1	Provide regular reports about water quality, including instances of potential/actual non-conformance, incidents and the actions taken in each case
		6.2	Report opportunities and recommendations for improvements in water quality monitoring or management in accordance with enterprise procedures
7	Maintain water quality records	7.1	Ensure all water quality records are legible, accurate and satisfy enterprise/legislative requirements
		7.2	Store water quality records to enable easy access and review by authorised personnel in accordance with enterprise procedures
		7.3	Regularly review water quality records to identify any significant trends and impacts
		7.4	Identify any problems with the maintenance and security of water quality records and resolve them promptly

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes, guidelines and equipment manuals • explaining relevant water quality standards, sampling/monitoring methods, equipment operating procedures and enterprise water quality management actions clearly and concisely • verifying the accuracy and completeness of water quality data, results and technical records • using statistical tests (e.g. to determine data acceptability, estimate uncertainties, examine trends and infer basic relationships) • recognising unexpected or unacceptable data and results • analysing records of sampling, monitoring and/or calibration activities to identify potential causes of unacceptable/unexpected data and results • recommending appropriate preventative/corrective actions to control potential/actual

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non-conformances or incidents • solving complex technical problems, including identifying and rectifying instrument faults • responding effectively to complaints and requests for information • seeking advice when issues/problems are beyond scope of competence/responsibility • maintaining records and providing accurate, complete and timely reports • working safely and monitoring the safety of others
Required knowledge
Required knowledge includes: • water quality management terminology, concepts and principles • legislative/regulatory requirements, standards, codes and guidelines dealing with water quality • enterprise water quality management plans, procedures (and water quality issues, control measures and mitigation/management actions for site/project, if relevant) • measurement parameters and for waters, sediments or biota (relevant to job role) • detailed scientific and technical knowledge of the samples, sampling/monitoring methods, equipment, materials and instrumentation used to generate the water quality data, including calibration, fault-finding and troubleshooting • expected values for water quality parameters, relevant ANZECC guidelines, and statutory environmental quality concentration limits or similar • problem-solving techniques and cause analysis • impacts of common human, environmental and/or meteorological factors on data quality • sources of interference, uncertainty, limitations of methods and sources of variability • enterprise procedures for identifying/assessing environmental risks/impacts, responding to complaints and environmental incidents, and record management and reporting water quality data • interpersonal communication, negotiation and conflict resolution techniques • relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence

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	include: • planning and implementing the day-to-day water quality management activities for a site, project or ongoing program • explaining water quality management plans, procedures, sampling/monitoring methods and operation of monitoring equipment clearly and accurately • verifying the accuracy and completeness of water quality data, results and technical records • investigating unexpected or unacceptable water quality results in a logical and efficient manner • reporting water quality results, performance and opportunities for improvements in accordance with enterprise procedures • maintaining water quality records in accordance with legislative/licensing/enterprise requirements.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027011A Select, commission and maintain environmental monitoring instruments.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, actions, procedures, checklists and equipment manuals • water quality data sets, records and reports • sampling methods and description of monitoring set-up, and access to monitoring, sampling and testing equipment • computer and relevant software or enterprise information management system.
Method of assessment	The following assessment methods are suggested: • review of water quality management data files, results and records verified by the candidate • feedback from managers and site personnel regarding

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	the candidate's ability to safely coordinate day-to-day water quality management activities • review of reports and recommended improvements for water quality monitoring or management prepared by the candidate • questions to assess understanding of procedures governing the validation of data; acceptability of data/results; sources of water quality data variability, interferences and uncertainty; and relevant preventative or corrective actions • analysis of case studies/reports of relevant water quality management issues and incidents • observation of the candidate providing water quality management information and/or instruction to other personnel. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations

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	and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS/NZS 2031:2001 Selection of containers and preservation of water samples for microbiological analysis • AS 3550 series - Water analysis • AS/NZS 4276 series - Water microbiology • AS/NZS 5667 series - Water quality - sampling • US Environmental Protection Authority (EPA) Methods and guidance for the analysis of water • American Public Health Association (APHA) Standard methods for the examination of waters and wastewaters • ANZECC Guidelines for fresh and marine water quality • Australian Guidelines for water quality monitoring and reporting • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Water quality measurement parameters (field and laboratory)	Water quality measurement parameters may include: • physical and chemical tests, such as: • temperature • electrical conductivity • phosphorus (total and soluble reactive) • nitrogen (nitrate, organic, ammonia and Kjeldahl) • ratio of total phosphorus to total nitrogen • total organic carbon (TOC) • dissolved organic carbon (DOC) • biological oxygen demand (BOD) • chemical oxygen demand (COD) • true colour (Pt/Co units) • turbidity

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	• Secchi disk depth • total suspended solids • volatile suspended solids • chlorophyll and phaeophytin • pH • silica • metals (total and dissolved) • organic and inorganic pollutants • microorganisms • ecotoxicological tests, such as: • toxicity tests (bioassays) using bacteria, algae, invertebrates and fish • use of biomarkers and bioaccumulation • ecological assessment (e.g. Australian River Assessment System (AUSRIVAS) for rapid assessment of health using macro invertebrates)
Sampling and field monitoring equipment	Sampling and field monitoring equipment may include: • bottle sampling containers (e.g. glass, polyethylene and plastic) • pumping systems for shallow depths, depth samplers, automatic samplers and integrating samplers • groundwater sampling systems • sediment sampling systems • samplers for aquatic organisms, such as nets, traps, cages, hose pipe, sticks and modified brushes • reagents, such as acid washes, electrode filling and storage solutions, and preservatives • filters, such as membrane, microfiber and paper • parameter specific meter or multi-probes (e.g. dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature) • field test kits to determine such parameters as dissolved gases, chemical anions and cations, heavy metals, E. coli and BOD • portable colorimeters, field microscopes • data loggers and global positioning system (GPS)
Water quality reports	Water quality reports may include: • weekly and monthly environmental reports • non-conformance report form • contributions to regulatory agency reports as required by permit, approval or licence conditions

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Water quality records	Water quality records may include: • digital photographs of water quality monitoring sites • data files • records required by permit, approval or licence conditions • records of monitoring equipment purchase, calibration, inspection, maintenance and service • records of complaints and government requests • records of water quality non-conformances, incidents or significant impacts • contractor and supplier information • internal quality/environmental audit reports • electronic/hard copy correspondence • records of approved expenditure and orders
Water quality management actions	Water quality management actions will vary greatly with the type of site and industrial processes involved and may include: • correct handling and storage of chemicals and fuels to prevent spills to wetlands and stormwater system • minimising water consumption through substitution, water efficient devices and recycling/reuse • scheduling of works to enable disturbed areas to be promptly re-vegetated or stabilised progressively • regular inspection and maintenance of sediment control structures and stormwater drainage pits • keeping stormwater run-off free of litter, gross pollutants and contaminants • diversion of clean run-off away from disturbed areas • use of vegetated swale drains and filter strips • use of erosion control structures, such as silt fences, sand bags and geofabric wrapped hay bales • checking water for contaminants before disposal • controlling the timing, frequency and magnitude of water releases from the site • controlling access of feral/stock and domestic animals to wetlands • limiting disturbance of wetlands, riparian areas and drainage channels by vehicles and/or boats
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal

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	legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027007A Coordinate air quality management activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to oversee the day-to-day air quality management activities for a site, project or an ongoing program. Personnel are required to interpret and implement an air quality management plan, organise specified management activities, verify the quality of monitoring data and investigate and rectify unexpected or unacceptable results, monitor compliance with relevant air quality objectives or standards, and provide reports. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental services involved with sampling and monitoring of ambient air, indoor air and workplace air parameters
- environmental compliance, auditing and inspection.

Note that the term ‘manager’ is used to refer to management of a function, project and/or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS025009A Perform sampling and testing of air OR

MSS025016A Perform sampling and testing of stationary emissions

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm scope of air quality management activities with manager	1.1	Review legislative, regulatory and licensing requirements and approvals that apply to site/project/program
		1.2	Review current air quality management plan, including objectives, known issues, specified management activities and any required changes
		1.3	Review previous air quality records and reports, if available
		1.4	Confirm that site set-up, sampling methods, instrumentation and enterprise procedures are in accordance with relevant standards and guidelines
		1.5	Clarify own scope of responsibility/authority for achieving specific outcomes and the roles of other key personnel
		1.6	Identify resources available to conduct air quality management activities
2	Organise air quality management activities	2.1	Develop a consolidated schedule to ensure all activities can be conducted efficiently with the available resources
		2.2	Develop checklists/clear work instructions to enable personnel to perform assigned tasks efficiently and with minimal errors
		2.3	Ensure that personnel who conduct sampling, monitoring and/or field testing are competent to undertake their assigned tasks
		2.4	Ensure air sampling/monitoring/testing equipment is regularly calibrated and maintained and that adequate stocks of consumables are available
		2.5	Ensure air samples are handled in accordance with the sampling method and chain of custody

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			requirements and dispatched promptly for analysis
		2.6	Arrange for source emission testing according to licence requirements (if relevant to site/project/program)
		2.7	Conduct, or arrange for, regular site inspections to monitor the effectiveness of air quality management actions (if relevant to site/project/program)
		2.8	Advise relevant personnel when specified air quality management actions are not being implemented effectively (if relevant to site/project/program)
		2.9	Conduct, or arrange for, additional monitoring/inspections after atypical events, legitimate complaints or government requests
3	Verify air quality data	3.1	Identify relevant job instructions, data and technical records in enterprise information management system
		3.2	Confirm that technical records provide sufficient information to ensure traceability/chain of custody for the monitoring activities involved
		3.3	Compare data with expected values and identify any outliers
		3.4	Inspect data records to identify any gaps and to check the integrity of data entry, transfers, alterations and calculations
		3.5	Notify manager when data is incomplete or contains significant errors, and clarify what action to take
4	Determine if results are acceptable and within expectation	4.1	Compare results with expected values and/or relevant standards and identify any significant differences or trends
		4.2	Check the reliability of results by examining data or results from other monitoring stations, repeat

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			measurements and/or tests of duplicate samples
		4.3	Assess the significance of any recorded atypical environmental or meteorological conditions
		4.4	Check that all calculations are free from error
		4.5	Check that estimations of uncertainty are reasonable and consistent with the sampling method, relevant standards or guidelines
		4.6	Report results that meet enterprise data quality standards and are consistent with expectations
5	Investigate/rectify unexpected or unacceptable results	5.1	Examine records of pre-use checks and calibration performance to ensure that the sampling equipment, reagents/standards and/or monitoring/test instruments used meet specifications and enterprise requirements
		5.2	Establish whether human, environmental and/or meteorological factors could have affected the reliability of results
		5.3	Check for obvious sources of interference that may have occurred during measurements or analysis of samples
		5.4	Retrieve stored samples (if available) and assess whether they are atypical or contaminated
		5.5	Arrange for control tests using the same or new samples to check unexpected results, if relevant
		5.6	Report unexpected results that meet enterprise data quality standards
		5.7	Identify possible root causes of unacceptable results and appropriate preventative/corrective actions
		5.8	Report investigation outcomes and recommendations for improvements in accordance with enterprise procedures
		5.9	Seek manager’s advice when challenges are beyond own technical competence or when input from environmental specialists may be required

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6	Keep management informed about air quality performance	6.1	Provide regular reports about air quality performance including instances of potential/actual non-conformance and incidents and the actions taken in each case
		6.2	Report opportunities and recommendations for improvements in air quality monitoring or management in accordance with enterprise procedures
7	Maintain air quality records	7.1	Ensure all air quality records are legible, accurate and satisfy enterprise/legislative requirements
		7.2	Store air quality records to enable easy access and review by authorised personnel in accordance with enterprise procedures
		7.3	Regularly review air quality records to identify any significant trends and impacts
		7.4	Identify any problems with the maintenance and security of air quality records and resolve them promptly.

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes, guidelines and equipment manuals • explaining relevant air quality standards, sampling/monitoring methods, equipment operating procedures and enterprise air quality management actions clearly and concisely • verifying the accuracy and completeness of air quality data, results and technical records • using statistical tests (e.g. to determine data acceptability, estimate uncertainties, examine trends and infer relationships) • recognising unexpected or unacceptable data and results • analysing records of sampling, monitoring and/or calibration activities to identify potential causes of unacceptable/unexpected data and results • recommending appropriate preventative/corrective actions to control potential/actual

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non-conformances or incidents
- solving complex technical problems, including identifying and rectifying instrument faults
- responding effectively to complaints and requests for information
- seeking advice when issues/problems are beyond scope of competence/responsibility
- maintaining records and providing accurate, complete and timely reports
- working safely and monitoring the safety of others

Required knowledge

Required knowledge includes:

- types and properties of air pollutants relevant to job role, such as particulates, inorganic gases, organic gases, photochemical smog and greenhouse gases
- legislative/regulatory requirements, standards, codes and guidelines dealing with air quality
- air quality management terminology, concepts and principles
- enterprise air quality management plans, procedures (and air quality issues, control measures and mitigation/management actions for site/project, if relevant)
- detailed scientific and technical knowledge of the samples, sampling/monitoring methods, equipment, materials and instrumentation used to generate the air quality data, including calibration, fault-finding and troubleshooting
- expected values for air quality parameters, relevant national environment protection measure standards and goals, or statutory environmental quality concentration limits or similar
- problem-solving techniques and cause analysis
- impacts of common human, environmental and/or meteorological factors on data quality
- sources of interference, uncertainty, limitations of methods, purpose of reference conditions and sources of variability (e.g. stack conditions)
- enterprise procedures for identifying assessing environmental risks/impacts, responding to complaints and environmental incidents, and record management and reporting air quality data
- interpersonal communication, negotiation and conflict resolution techniques
- relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations

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	and contexts. Critical aspects of assessment and evidence include: • planning and implementing the day-to-day air quality management activities for a site, project or ongoing program • explaining air quality management plans, procedures, sampling/monitoring methods and operation of monitoring equipment clearly and accurately • verifying the accuracy and completeness of air quality data, results and technical records • investigating unexpected or unacceptable air quality results in a logical and efficient manner • reporting air quality results, performance and opportunities for improvements in accordance with enterprise procedures • maintaining air quality records in accordance with legislative/licensing/enterprise requirements.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027011A Select, commission and maintain environmental monitoring instruments.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, actions, procedures, checklists and equipment manuals • air quality data sets, records and reports • sampling methods and description of monitoring set-up, access to monitoring, sampling and testing equipment • computer and relevant software or enterprise information management system.
Method of assessment	The following assessment methods are suggested: • review of air quality data files, results and records verified by the candidate • feedback from managers and site personnel regarding

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	the candidate's ability to safely coordinate day-to-day air quality management activities • review of reports and recommended improvements to air quality monitoring or management prepared by the candidate • questions to assess understanding of procedures governing the validation of data; acceptability of data/results; sources of air quality data variability, interferences and uncertainty; and relevant preventative or corrective actions • analysis of case studies/reports of relevant air quality management issues and incidents • observation of the candidate providing air quality management information and/or instruction to other personnel. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations

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	and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • pollution and contaminated sites • Australian and international standards, such as: • AS/NZS 3580 series Methods for sampling and analysis of ambient air • AS 2365 series Methods for the sampling and analysis of indoor air • AS 2986 series Workplace air quality • National Environment Protection Measure (Ambient Air Quality) • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. environmental protection and impact assessment) • material safety data sheets (MSDS) • occupational health and safety (OHS) national standards and codes of practice • site-specific requirements
Air quality management activities	Air quality management activities will vary greatly with the type of site/project/program. They could involve either ambient air monitoring or source emission testing and may include: • determination of sampling point locations, sampling methods, number and type of samples, duration and frequency of sampling • specification of site sampling plans • specification of site equipment, such as instruments, and sampling ports/platforms to meet quality and safety requirements • arranging/conducting the set-up, calibration, (re)configuration, maintenance and troubleshooting of equipment • liaison with site personnel to coordinate process operations and sampling programs to ensure representative results • instruction and auditing of personnel to ensure monitoring, sampling and testing methods or procedures are followed • analysis and verification of results • investigation of unexpected and unacceptable results,

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	including non-compliances • liaison/negotiation with regulators about licence conditions, and explanation of results and non-compliances • specification of air quality management actions for sites • site inspections to monitor the effectiveness of air quality management actions
Ambient air parameters	Ambient air parameters may include: • inorganic gases: • CO, CO_2, NO_x and SO_x • acid gases • H_2S • ozone • fluorides • organic gases: • methane and non-methane hydrocarbons • poly-aromatic hydrocarbons (PAHs) • organic oxidants and other photochemical smog compounds (e.g. poly-aromatic nitrates (PANs)) • air toxics: • benzene, toluene and xylenes • formaldehyde • Benzo(a)pyrene (PAH marker) • particulates: • deposited matter • suspended matter (PM_{10}, $PM_{2.5}$ and PM_1) • particulate fluorides • lead
Indoor air parameters	Indoor air parameters may include: • inorganic gases, such as: • CO, CO_2 and NO_x • radon • organic gases, such as: • formaldehyde • PAHs • organic oxidants and other photochemical smog compounds (e.g. PANs) • particulates, such as: • suspended matter (PM_{10}, $PM_{2.5}$ and PM_1) • microorganisms and spores

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Occupational (workplace) air parameters	Occupational (workplace) air parameters may include chemicals listed in the '*Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment'*. Concentration levels for action are: • peak • short term exposure limit (STEL) • time weighted average (TWA)
Sampling equipment	Sampling equipment may include: • gas sample bags and gas sample bottles/containers • gas pipettes and gas syringes • air sampling pumps • sampling manifolds • passive diffusion samplers • impingers (with absorption solutions) • solid adsorbents • colour detection tubes • coated and uncoated filters • sampling trains in continuous gas monitors • pitot tubes • high volume samplers • dichotomous samplers • gas flow meters
Testing equipment	Testing equipment may include: • continuous gas monitors • ultraviolet (UV) absorption (e.g. ozone) • chemiluminescence (e.g. NO_x) • pulsed fluorescence (e.g. (SO_x) • non-dispersive Infrared (e.g. CO) • flame ionisation detection (FID) (e.g. methane) • photo ionisation detection (PID) • integrating nephelometer methodologies (e.g. suspended particulates) • oxygen sensors (e.g. zirconia) • gas chromatographs • mass spectrometers • atomic absorption spectrophotometers • infrared spectrophotometers • UV-visible spectrophotometers • tapered element oscillating microbalance (TEOM) • beta gauges

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	• particle counters • portable (handheld) gas monitors
Air quality reports	Air quality reports may include: • weekly and monthly environmental reports • non-conformance report form • contributions to regulatory agency reports (where required by permit, approval or licence conditions)
Air quality records	Air quality records may include: • digital photographs of air quality monitoring sites • data files • records required by permit, approval or licence conditions • records of monitoring equipment purchase, calibration, inspection, maintenance and service • records of complaints and government requests • records of air quality non-conformances, incidents, or significant impacts • contractor and supplier information • internal quality/environmental audit reports • electronic/hard copy correspondence • records of approved expenditure, orders
Air quality management actions	Air quality management actions will vary greatly with the type of site and industrial processes involved and may include: • use of adsorbers, filters and scrubbers • use of water and/or enclosing transfer points, operating equipment and discharge points to reduce dust • covering and/or watering stockpiles when not in use • keeping vehicle movements to engineered routes • using appropriate dust suppressants • limiting clearance/excavation areas to minimise ground disturbance • using mulch or vegetation cover to stabilise soils • prohibiting the burning of vegetation or waste • limiting or ceasing activities (e.g. dusty work) during unfavourable weather conditions (e.g. high wind) • use of wind breaks and wind fences to prevent migration of dust
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and

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	environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027008A Coordinate noise management activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to oversee the day-to-day noise management activities for a site, project or ongoing program. Personnel are required to interpret and implement a noise monitoring plan, organise specified monitoring activities, verify the quality of monitoring data and investigate and rectify unexpected or unacceptable results, monitor compliance with relevant noise standards/limits, and provide reports. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental services involved with sampling, monitoring and/or control of noise
- environmental compliance, auditing and inspection.

Note that the term ‘manager’ is used to refer to management of a function, project and/or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSS025008A Monitor and evaluate noise

Employability Skills Information

Not applicable.

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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm scope of noise management activities with supervisor	1.1	Review legislative, regulatory and licensing requirements and approvals that apply to site/project/program
		1.2	Review current noise monitoring plan, including objectives, known issues, specified management activities and any required changes
		1.3	Review previous noise monitoring records and reports, if available
		1.4	Confirm that noise monitoring sites, sampling and measurement methods, instrumentation and enterprise procedures are in accordance with relevant standards and guidelines
		1.5	Clarify own scope of responsibility/authority for achieving specific outcomes and the roles of other key personnel
		1.6	Identify resources available to conduct noise management activities
2	Organise noise management activities	2.1	Develop a consolidated schedule to ensure all activities can be conducted efficiently with the available resources
		2.2	Develop checklists/clear work instructions to enable personnel to perform assigned tasks efficiently and with minimal errors
		2.3	Ensure that personnel who conduct monitoring are competent to undertake their assigned tasks
		2.4	Ensure noise monitoring equipment is regularly calibrated and maintained and that adequate stocks of consumables are available
		2.5	Conduct, or arrange for, regular site inspections to monitor the effectiveness of noise control/reduction actions (if relevant to

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			site/project/program)
		2.6	Advise relevant personnel when specified noise control/reduction actions are not being implemented effectively (if relevant to site/project/program)
		2.7	Conduct, or arrange for, additional monitoring/inspections after atypical events, legitimate complaints or government requests
3	Verify noise data	3.1	Identify relevant job instructions, data and technical records in enterprise information management system
		3.2	Confirm that technical records provide sufficient information to ensure traceability for the monitoring activities involved
		3.3	Compare monitoring data with expected values and identify any outliers
		3.4	Inspect data records to identify any gaps and to check the integrity of data entry, transfers, alterations and calculations
		3.5	Notify manager when data is incomplete, or contains significant errors, and clarify what action to take
4	Determine if results are acceptable and within expectation	4.1	Compare results with expected values, relevant standards and/or statutory limits and identify any significant differences or trends
		4.2	Check the reliability of results by examining data/results from repeat measurements or other monitoring sites
		4.3	Assess the significance of any documented observations of atypical environmental or meteorological conditions
		4.4	Check that all adjusted data and calculations are free from error
		4.5	Check that estimations of uncertainty are

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			reasonable and consistent with the relevant standard, if relevant
		4.6	Report results that meet enterprise data quality standards and are consistent with expectations
5	Investigate/rectify unexpected or unacceptable results	5.1	Examine records of pre-use checks and calibration performance to ensure that the monitoring instruments used meet specifications and enterprise requirements
		5.2	Establish whether human, environmental and/or meteorological factors could have affected the reliability of results
		5.3	Check for obvious errors in measurement positions and/or techniques
		5.4	Report unexpected results that meet enterprise data quality standards
		5.5	Identify possible root causes of unacceptable results and appropriate preventative/corrective actions
		5.6	Report investigation outcomes and recommendations for improvements in accordance with enterprise procedures
		5.7	Seek manager's advice when challenges are beyond own technical competence or when input from environmental specialists may be required
6	Keep management informed about noise performance	6.1	Provide regular reports about noise performance including instances of potential/actual non-conformance and incidents and the actions taken in each case
		6.2	Report opportunities and recommendations for improvements in noise monitoring or management in accordance with enterprise procedures
7	Maintain noise	7.1	Ensure all noise records are legible, accurate and

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records		satisfy enterprise/legislative requirements
	7.2	Store noise records to enable easy access and review by authorised personnel in accordance with enterprise procedures
	7.3	Regularly review noise records to identify any significant trends and impacts
	7.4	Identify any problems with the maintenance and security of noise records and resolve them promptly

Required Skills and Knowledge

Required skills
Required skills include: • accessing, interpreting and applying relevant legislative/regulatory requirements, standards, codes, guidelines and equipment manuals • explaining relevant noise standards and/or statutory limits, monitoring methods, equipment operating procedures and enterprise noise control/reduction actions clearly and concisely • verifying the accuracy and completeness of data, results and technical records • using statistical tests (e.g. to determine data acceptability, estimate uncertainties, examine trends and infer basic relationships) • recognising unexpected or unacceptable data and results • analysing records of monitoring activities, including pre-use checks and calibration, to identify potential causes of unacceptable/unexpected data and results • recommending appropriate preventative/corrective actions to control potential/actual non-conformances or incidents • solving complex technical problems, including identifying instrument faults • responding effectively to complaints and requests for information • seeking advice when issues/problems are beyond scope of competence/responsibility • maintaining records and providing accurate, complete and timely reports • working safely and monitoring the safety of others
Required knowledge
Required knowledge includes: • terminology, concepts and principles associated with sound, noise measurement, noise control and reduction

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- legislative/regulatory requirements, standards, codes and guidelines dealing with environmental and/or occupational noise
- noise measurement parameters and associated measurement methods (relevant to job role)
- enterprise noise monitoring plans, procedures (and noise issues, noise control devices and noise reduction actions for site/project, if relevant)
- detailed scientific and technical knowledge of the monitoring methods and instrumentation used to generate the noise data, including calibration, simple fault-finding and troubleshooting
- expected values for noise parameters, relevant standards, and statutory noise limits or similar
- problem-solving techniques and cause analysis
- impacts of common human, environmental and/or meteorological factors on data quality
- sources of interference, uncertainty, limitations of methods and sources of variability
- enterprise procedures for identifying/assessing environmental risks/impacts, responding to complaints and environmental incidents, and record management and reporting noise data
- interpersonal communication, negotiation and conflict resolution techniques
- relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • planning and implementing the day-to-day noise management activities for a site, project or ongoing program • explaining noise monitoring plans, monitoring methods operation of monitoring instruments and noise control/reduction strategies clearly and accurately • verifying the accuracy and completeness of noise data, results and technical records • investigating unexpected or unacceptable noise results in a logical and efficient manner • reporting noise results, performance and opportunities for improvements in accordance with

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	enterprise procedures • maintaining noise records in accordance with legislative/licensing/enterprise requirements.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027011A Select, commission and maintain environmental monitoring instruments.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • site/project/program history • relevant legislation, codes, standards, enterprise environmental management policies, plans, actions, procedures, checklists and equipment manuals • noise data sets, records and reports, and noise control/reduction strategies • monitoring methods and description of monitoring set-up, access to monitoring instruments • computer and relevant software or enterprise information management system.
Method of assessment	The following assessment methods are suggested: • review of noise data files, results and records verified by the candidate • feedback from managers and site personnel regarding the candidate's ability to safely coordinate day-to-day noise monitoring activities • review of reports and recommended improvements to noise monitoring or noise control/reduction prepared by the candidate • questions to assess understanding of procedures governing the validation of data; acceptability of data/results; sources of noise data variability, interferences and uncertainty; and relevant preventative or corrective actions • analysis of case studies/reports of relevant noise management issues and incidents • observation of the candidate providing information and/or instruction to other personnel about noise

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	monitoring and/or control and reduction strategies. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	Legislation, standards, codes, procedures and/or enterprise requirements may include: • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • occupational health and safety (OHS) • Australian and international standards, such as: • AS 1055.1:1997 Acoustics - Description and measurement of environmental noise -General procedures • AS 1055.2:1997 Acoustics - Description and measurement of environmental noise - Application to specific situations • AS 1055.3:1997 Acoustics - Description and measurement of environmental noise -Acquisition of

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	data pertinent to land use • AS IEC 61672.1:2004 Electroacoustics - Sound level meters - Specifications • AS IEC 61672.2 Electroacoustics - Sound level meters - Pattern evaluation tests • AS IEC 60942:2004 Electroacoustics - Sound calibration • Environmental Protection Authority (EPA) or government departmental guidelines and manuals, such as: • Noise Measurement Manual (QLD EPA) • A Guide to Measurement and Analysis of Noise (VIC EPA) • Noise Guide for Local Government (NSW) • equipment manuals and warranties, supplier catalogue and handbooks • government policy (e.g. sustainable development and impact assessment) • OHS national standards and codes of practice • site specific requirements • specific environmental standards
Noise management activities	Noise management activities may include: • assessing compliance with a statutory condition, such as a licence • investigation of a noise complaint • noise impact assessment studies • long-term monitoring programs • occupational hygiene monitoring • noise surveys • assessing effectiveness of noise control devices and reduction measures
Principles and concepts associated with noise measurement	Principles and concepts associated with noise measurement may include: • noise terminology: • sound and noise, • frequency, pitch and wavelength • sound power and acoustic energy • sound pressure and sound pressure level • sound intensity • noise measurement units (dBA and others) • frequency weighting curves • adding and subtracting sound levels

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	• physiology of hearing • perception of noise (e.g. 'offensive' and 'intrusive' noise) • sources of noise • typical noise levels • types of noise: • continuous • intermittent • impulsive • point sources and line sources
Noise measurements and surveys	Noise measurements and surveys may include: • techniques for conducting sound and noise level measurements, such as: • sound power and sound pressure level measurements • frequency analysis and weighting networks (including at least A and Lin) • techniques for measuring different noise types, including steady noise, discretely varying noise, impulsive noise, industrial, road, traffic, rail traffic and air traffic • background noise level (L_{A90}) • day and night sound levels (L_{DN}) • measuring noise exposure, including equivalent continuous sound level (L_{eq}) • time weighted exposure measurement (L_{AeqT}) • common errors in sound level measurement, including mishandling of equipment, wind, humidity, temperature, reflected and absorbed sound and background noise • effects of meteorological conditions on noise • effects of topography and built structures on noise • data processing techniques, such as: • calculation of combined sound levels using graphical and mathematical equation techniques • background noise calculations • statistical analysis, including L_{Aeq}, L_{A10}, L_{A50}, and L_{A90} • characterisation of noise by octave band analysis • calculation of individual noise exposure • noise mapping • noise rating curves • sound attenuation with distance and mathematical calculation of associated quantities • using a wide range of instruments, instrument

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	functions and displays, such as: • sampling rate • optimum level range, sensitivity and self-generated noise • measurement time intervals, integration and averaging • response rates for sound meters, including fast, slow, impulse and peak • hold features • overload and under-range indications • threshold levels • data transfer and interfacing • calibration and reference checks of sound level meters, including both electrical and acoustic
Noise monitoring instruments and ancillary equipment	Noise monitoring instruments and ancillary equipment may include: • type 1 and type 2 portable sound level meters • integrating and non-integrating sound level meters • noise dose meters • sound level calibrators • octave analysers • statistical analysers, data loggers and recorders • telemetry equipment • sound monitoring stations • microphones • wind shields
Additional resources and equipment	**Additional resources and equipment** may include: • meteorological instruments, such as: • thermometers • hygrometers • barometers • anemometers • digital cameras • global positioning system (GPS) equipment • site plans, maps and aerial photographs • noise measurement and survey forms • personal protective equipment
Meteorological measurements	**Meteorological measurements** may include: • temperature • relative humidity • barometric pressure

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	• wind speed and direction
Noise control/reduction actions	Noise control/reduction actions will vary greatly with the type of site and industrial processes involved and may include: • (re)design of work practices to minimise noise emissions, such as: • increase distance between noise generator and sensitive receiver • re-orient equipment to direct noise away from sensitive area • schedule operations so that noisy equipment is used separately rather than concurrently • use 'quiet' work practices (e.g. requiring trucks to turn off rather than idling for long periods) • substitute noisy equipment for quieter equipment (e.g. improved fan design, vibrating pile drivers and hydraulic crushers) • install specific noise reduction devices, such as equipment silencers and mufflers, noise barriers and enclosures, and installation of sound insulation • consult with nearby receivers, especially if 'one-off' or rare noise generating activities are to be conducted outside standard hours
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of field work and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

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Custom Content Section

Not applicable.

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MSS027009A Coordinate site remediation or rehabilitation activities

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to oversee the day-to-day environmental remediation or rehabilitation activities at a site in accordance with an established management plan. Personnel assist with the planning and implementation of specific remediation/rehabilitation activities, liaise with contractors and consultants, and monitor both the progress and effectiveness of the activities. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management (e.g. wetlands)
- landfill management
- site remediation or rehabilitation services (e.g. mine, construction and industrial).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Path 1	*MSS025006A*	*Collect and evaluate groundwater data*
	MSS025007A	*Perform sampling and testing of soils*
	MSS024008A	*Recognise common geological landforms and*

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		samples
Path 2	*MSS025006A*	*Collect and evaluate groundwater data*
	MSS025007A	*Perform sampling and testing of soils*
	MSS025013A	*Assist with assessing and monitoring wetlands*

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Confirm scope of site remediation and/or rehabilitation activities with manager	1.1	Locate and review legislative, regulatory, licensing/ approval and planning requirements that apply to the site
		1.2	Review background information, site remediation/ rehabilitation management plan and any relevant reports
		1.3	Review site remediation/rehabilitation goals and strategies, key stakeholders and their issues and likely constraints
		1.4	Review the technical specifications and plans for each activity
		1.5	Confirm the roles and responsibilities of the enterprise staff, consultants and contractors involved; the work requirements and timeframe for each activity
		1.6	Confirm own role, limits of responsibility and reporting requirements for the coordination of assigned activities

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2	Plan and organise activities	2.1	Consolidate schedules of activities, timeframes and milestones on a single planning management framework to enable efficient coordination of each activity
		2.2	Use appropriate project management tools to achieve efficient integration and sequencing of activities
		2.3	Ensure that forward planning takes into account variables such as seasonal factors, availability of equipment, seeds and plants and site access
		2.4	Identify possible/actual clashes and negotiate solutions with other staff, consultants, contractors and/or own manager, as appropriate
3	Liaise with site personnel and community members	3.1	Confirm that staff, consultants and/or contractors understand the timing and technical specifications for their assigned remediation/rehabilitation activities
		3.2	Confirm that staff, consultants and/or contractors are aware of hazards and understand site safety procedures and their environmental management obligations
		3.3	Provide timely, authorised information to community members about remediation/rehabilitation activities in accordance with enterprise procedures
		3.4	Solve problems and address issues/complaints arising from remediation/rehabilitation activities within scope of responsibility
		3.5	Refer complex problems, issues and complaints to relevant personnel in accordance with enterprise procedures
4	Monitor progress of activities	4.1	Anticipate risks to progress and notify relevant personnel
		4.2	Monitor completion of activities and progress against work requirements and milestones

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		4.3	Develop solutions in response to problems or unforseen/changed circumstances in consultation with site personnel and/or own manager, as appropriate
		4.4	If necessary, negotiate and/or implement adjustments to work programs with site personnel in accordance with enterprise procedures
		4.5	Record and store required information for each activity
5	Monitor the effectiveness of activities	5.1	Conduct, or arrange for, site inspections to check if work requirements for each activity have been met
		5.2	Conduct, or arrange for, the monitoring of specified environmental parameters to assist with the evaluation of remediation/ rehabilitation activities
		5.3	Examine results of regular surveys, inspections and environmental monitoring to identify significant trends in data, performance indicators or non-conformances
		5.4	If necessary, clarify any significant remediation/ rehabilitation performance issues with the consultant or contractor involved to ensure details are fully understood
		5.5	Seek manager's advice when challenges are beyond own technical competence or when further input from environmental specialists may be required
6	Report the progress and effectiveness of activities	6.1	Provide regular reports to relevant personnel about the progress and environmental performance of assigned remediation/rehabilitation activities
		6.2	Report any instances of potential/actual environmental management non-conformance and incidents and the actions taken in each case

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		6.3	Report opportunities and recommendations for improved coordination of remediation/rehabilitation activities accordance with enterprise procedures
7	Maintain records of activities	7.1	Ensure all required records are legible, accurate and satisfy enterprise/legislative requirements
		7.2	Store records of remediation/rehabilitation activities to enable easy access and review by authorised personnel

Required Skills and Knowledge

Required skills
Required skills include: • explaining and correctly applying enterprise site remediation/rehabilitation management plans, procedures and the technical details of specific activities • analysing complex technical briefs and project plans • managing logistics of multiple activities • managing self, time and costs • using project management tools to plan, implement and monitor activities • using systematic, logical problem-solving techniques in response to problems and changed/unforseen circumstances • negotiating changes to timelines, roles, responsibilities and resources • communicating and consulting effectively with enterprise managers, consultants, contractors, stakeholders and community members to achieve outcomes • using enterprise information management systems, project management software • recording complex information accurately • writing recommendations and preparing reports involving complex technical issues • working safely
Required knowledge
Required knowledge includes: • environmental protection/management terminology, concepts and principles • legislative, regulatory, permit, licensing, approval requirements/processes relevant to site remediation/rehabilitation activities

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- common site remediation/rehabilitation goals, success criteria and strategies
- remediation/rehabilitation planning and design principles, including stakeholder engagement
- site remediation and rehabilitation methods and techniques relevant to job role
- common examples of environmental parameters, analytical tests, and flora and fauna surveys used to monitor the effectiveness of site remediation/rehabilitation
- site characteristics, nature of activities conducted at site, environmental management values, environmental issues, risks and impacts
- enterprise environmental management plans, procedures, control measures and management actions for site activities
- enterprise project management procedures and controls, such as:
- project governance requirements
- stakeholder management
- quality standards
- risk management plans
- record management and reporting, confidentiality and security of information
- quotation, tendering, procurement and contract management procedures, and delegations
- financial management procedures
- human resource management procedures and industrial agreements
- project management principles
- interpersonal communication, negotiation and conflict resolution techniques
- problem-solving techniques
- relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • applying a working knowledge of remediation/ rehabilitation principles to analyse complex technical briefs and develop/refine plans • planning and coordinating the efficient implementation of site remediation/rehabilitation activities • supporting, communicating and consulting with site

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	personnel and/or community members to achieve quality outcomes on time and within budget • analysing and solving project management problems • monitoring progress of activities and assisting with the evaluation of outcomes • maintaining accurate records of activities • providing regular information and reports of progress and outcomes of activities • recommending ways of improving the coordination of future activities.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS025014A Perform sampling and testing of contaminated sites.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • enterprise environmental management plans and procedures, and project management tools • background information for environmental sites and remediation/rehabilitation projects/programs • enterprise information management systems.
Method of assessment	The following assessment methods are suggested: • review of plans, records, outcomes and reports associated with remediation/rehabilitation activities that the candidate has coordinated • feedback from manager, other site personnel and community members about the candidate's ability to effectively coordinate remediation/ rehabilitation activities • questioning/interview to assess understanding of remediation/rehabilitation principles, project management and the candidate's problem-solving ability • observation of the candidate's interactions with site personnel and/or community members. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those

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	aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water, water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set

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	• standards covering sampling, testing and/or monitoring of air, water and soils • National Environment Protection Measure (Assessment of Site Contamination) • ANZECC Guidelines for the Assessment of Contaminated Soil • Australian government guidelines, such as the Leading Practice Sustainable Development Program for the Mining Industry (Mine Rehabilitation) • environmental management plan, rehabilitation program plan, and site information about applicable legislative requirements and approval requirements • information about site processes, work schedules and remediation/rehabilitation processes • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • procedures for monitoring remediation/rehabilitation program • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures and work method statements • material safety data sheets (MSDS)
Remediation/rehabilitation plans, programs and activities	Remediation/rehabilitation plans, programs and activities may include details of: • site goals and success criteria • regulatory, licensing and approvals requirements • consultation processes and community engagement • characterisation of site to identify materials and/or contamination present, such as: • materials segregation and selective placement • material budget and schedule • identification of limitations to plant growth • initial site assessment, such as : • protection measures for rare/endangered species and heritage sites • climate • water budget and salt budget • growth media (e.g. harvested topsoils) • remediation/rehabilitation program/activities, such as

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	: • landform design (e.g. placement, height, footprint, drainage, mode of construction, profiles and covers) • management of waste rock, tailings and/or wastewater • removal, containment and/or on/off site treatment of contaminated materials • landform reconstruction, filling of voids/pits and reinstatement of water diversions • topsoil management to preserve soil fertility and biota, treatments and fertiliser use • establishment of vegetation (e.g. controlling weeds, collection and retention of local seeds and propagules, seeding (supply, treatment, spreading and hydro), and hand/machine planting of seedlings, mulching, watering, maintenance and staking/protection) • establishment of fauna communities (e.g. controlling problem animals and constructing habitats) • environmental parameters and monitoring procedures for remediation/rehabilitation program • recording and reporting requirements
Background information	Background information may include: • legislative/regulatory, permit, licence and approval requirements for site • site access protocols and permits • site history, client history and correspondence • site industrial processes and work schedules • records of consultations with stakeholders • maps (road and topographical) • existing databases (e.g. vegetation, topography, soils and regional ecosystem maps) • geological, hydro geological, ecological and meteorological data for site • enterprise environmental management plans for site • emergency plans and safety procedures • enterprise, regulatory or standard methods/procedures for environmental sampling, monitoring or in-field testing • relevant reports, case studies and good practice models for site remediation/rehabilitation
Site personnel and community members	Site personnel and community members may include: • enterprise employees, site and project managers

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	• contractors and subcontractors • suppliers and service providers • consultants (e.g. scientists, planners, engineers and external auditors) • government/regulator representatives and inspectors • community representatives, landowners, traditional owners and community volunteers
Site hazards	Site hazards may include: • solar radiation, dust and noise • air and soil borne microorganisms • chemicals, radioactive and other hazardous materials • cuts, crushing and entanglement from tools or moving machinery parts • manual handling of heavy materials and equipment • heavy vehicle traffic on site • slippery, uneven surfaces
Safety procedures	Safety procedures may include: • identifying hazards, assessing and reporting risks • cleaning, maintaining and storing tools, equipment and machinery • safe operation of tools, equipment and machinery • safe handling, use and storage of chemicals and other hazardous materials • safe manual handling of items • obeying signage and using safety equipment, such as protective barriers • using specified personal protective equipment
Environmental obligations	Environmental obligations of site personnel may include: • sustainable use of resources • duty of care to protect the site's natural, cultural and heritage values • not polluting, damaging or degrading the site's natural resources, ecological processes or biodiversity • avoiding introduction or transfer of weeds or plant/animal pathogens in soils
Monitoring strategies	Monitoring strategies may include: • use of transects to collect data across many types of landscape or ages of revegetation • use of point and quadrat sampling along transects • ecosystem function analysis:

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	• landscape and soil analysis (e.g. rainfall, infiltration, run-off, erosion, plant growth and nutrient cycling) • vegetation analysis (e.g. species composition and structure) • habitat and fauna analysis (e.g. use of indicator species, such as reptiles and ants, and soil-litter biota) • use of remote sensing: (e.g. aerial photography and satellite imagery)
Environmental monitoring parameters for remediation/rehabilitation programs	Environmental monitoring parameters for remediation/rehabilitation programs may include: • air quality • quality of surface water and groundwater • residual contamination in soils • surface (and slope) stability • assessment of erosion, measurement of suspended sediment loads in run-off • performance of constructed covers over mine or industrial/mineral processing waste • properties of soil or root zone media, such as chemistry, fertility and water • plant community structural attributes, such as cover, and woody species density and height • plant community composition, such as presence of desired species, condition and abundance • presence of pest species, such as feral animals and weeds • selected indicators of ecosystem functioning, such as soil microbial biomass and ants • return of selected mammals, reptiles, macro-invertebrates, fish and birds to site
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027010A Undertake complex environmental project work

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to carry out complex environmental project activities and/or coordinate the activities of concurrent projects. Personnel are required to review and confirm the requirements of each project/activity, organise and carry out project activities, oversee the progress of projects/activities and finalise the work in each case. They may be responsible for all or some project deliverables, work in teams on aspects of projects, and may liaise with multiple clients. They work under the supervision of an environmental scientist or engineer, site manager or enterprise environmental manager. The unit does not cover procurement of project resources and contract management.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Review and confirm project requirements with manager	1.1	Confirm own role, limits of responsibility and reporting requirements for assigned projects/project activities
		1.2	Review enterprise project management procedures and controls
		1.3	Review background information for each project/project activity to clarify intended outcomes, key stakeholders, drivers and likely constraints
		1.4	Analyse project plans and clarify roles and responsibilities of project team members, deliverables, timeframes, stakeholder involvement and available resources
		1.5	Negotiate any necessary changes to project plans in accordance with enterprise project management procedures
		1.6	Update project plans with confirmed information for milestones, resources, team members and stakeholder details, as appropriate
2	Organise and undertake project activities	2.1	Use appropriate project management tools to achieve efficient integration and sequencing of projects/activities
		2.2	Consolidate schedules of activities, timeframes and milestones on a single planning management framework to enable efficient monitoring of each project/project activity
		2.3	Identify possible/actual clashes in activities and negotiate alternatives with project managers

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			and/or own manager, as appropriate
		2.4	Carry out own project tasks in accordance with relevant project plans and manage any variations in accordance with enterprise project management procedures
		2.5	Capture, record and store required project information and data
		2.6	Support project team members to achieve project milestones and assigned outputs with resources available
		2.7	Seek manager's advice when challenges are beyond own technical competence or when input from environmental specialists may be required
3	Manage the progress of multiple projects/activities	3.1	Anticipate risks to progress or achievement of project outcomes and notify relevant personnel in accordance with risk management plans
		3.2	Monitor completion of project activities and progress against targets and milestones
		3.3	Negotiate and/or implement corrective actions, as necessary, with project team members/managers in accordance with enterprise project management procedures and controls
		3.4	Develop solutions in response to project problems or unforseen/changed circumstances in consultation with project managers and/or own manager, as appropriate
		3.5	Provide regular project reports in accordance with project plans and enterprise project management procedures
4	Finalise project activities	4.1	Provide deliverables for each project/project activity in accordance with the specified timeframe and quality standards
		4.2	Provide deliverables for each project/project activity in accordance with the specified

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	timeframe and quality standards
4.3	Ensure all project records are accurate and complete
4.4	Evaluate project processes to identify unresolved issues and recommend opportunities for improvement of future projects/project activities
4.5	Provide timely and accurate project reports in accordance with enterprise project management procedures and using the specified style, language and formatsArchive project information and return borrowed/unused resources in accordance with enterprise project management procedures

Required Skills and Knowledge

Required skills
Required skills include: • explaining and correctly applying enterprise project management procedures and controls • analysing complex technical briefs and project plans • managing logistics of multiple projects/activities • managing self, time and costs • using project management tools to plan, monitor and evaluate projects • using systematic, logical problem-solving techniques in response to problems and changed/unforseen circumstances • negotiating changes to timelines, roles, responsibilities and resources • communicating and consulting effectively with a wide range of team members, project managers, stakeholders and community members to achieve project outcomes • using enterprise information management systems and project management software • recording complex information accurately • writing recommendations and preparing reports involving complex technical issues • working safely
Required knowledge
Required knowledge includes: • environmental protection/management terminology, concepts and principles • legislative, regulatory, permit, licensing and approval requirements/processes relevant to

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site/projects/project activities • enterprise business goals, key performance indicators and key result areas • site/project characteristics, nature of activities conducted at site, environmental management values, environmental issues, risks and impacts • enterprise environmental management plans, procedures, control measures and management actions for site/projects/project activities • enterprise project management procedures and controls, such as: • project governance requirements • stakeholder management • quality standards • risk management plans • record management and reporting, confidentiality and security of information • quotation, tendering, procurement and contract management procedures, and delegations • financial management procedures • human resource management procedures and industrial agreements • project management principles • interpersonal communication, negotiation and conflict resolution techniques • problem-solving techniques • relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • analysing complex technical briefs and refining project plans • planning and managing the efficient implementation of complex and/or concurrent projects/project activities • providing own outputs in accordance with project plans • supporting, communicating and consulting with project teams to achieve quality outcomes on time and within budget

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	• analysing and solving project management problems • monitoring progress of projects/activities and evaluating outcomes • maintaining accurate records • providing regular updates/briefings and reports of project progress and outcomes • recommending ways of improving future project processes and management systems.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *relevant MSS027000A series units.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • enterprise project management procedures and tools • background information for environmental sites/projects/programs • enterprise information management systems.
Method of assessment	The following assessment methods are suggested: • review of plan refinements, project schedules, budgets, records, outcomes and reports associated with complex projects/activities that the candidate has managed or undertaken • feedback from managers and project team members about the candidate's ability to effectively coordinate and support complex project work • questioning/interview to assess understanding of project management principles and the candidate's ability to solve significant problems with projects • observation of the candidate's interactions with project team members. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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	disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites • fisheries, forestry and mining operations • Australian and international standards, such as: • AS/NZS ISO 14000 Set:2005 Environmental management standards set • standards covering sampling, testing and/or monitoring of air, water and soils • environmental management plan, and site information about applicable legislative requirements and approval requirements

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	• information about site processes and work schedules • information about emergency preparedness and response • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils) • job hazard analyses • safe work procedures, work method statements • material safety data sheets (MSDS)
Complex environmental project work	Complex environmental project work may include developing, evaluating/updating and implementing environmental management and/or monitoring programs associated with: • planning, operation or closure of construction, infrastructure, industrial and mining sites • rehabilitation of sites • revegetation of sites • management of pests • acid sulphate soils • acid rock drainage • wetlands • stormwater systems • air quality, dust and emissions/odours • water quality and water supply/use issues • contaminated sites (e.g. hydrocarbons) • waste, stockpiles and waste rock dumps • protection of biodiversity • acquisition and commissioning of complex equipment • significant quality improvement projects • set-up and operation of remote sensing sites • set-up and operation of groundwater bores • investigating a multifaceted or difficult environmental complaint, non-conformance or incident
Background information	Background information may include: • legislative/regulatory, permit, licence and approval requirements for site/project • site or project history • client history and correspondence

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	• information about site processes and work schedules • records of consultations with stakeholders • emergency plans and safety procedures • site access protocols and permits • maps (road and topographical) • existing databases (e.g. vegetation, topography, soils and regional ecosystem maps) • enterprise environmental management plans for site • enterprise, regulatory or standard methods/procedures for environmental sampling, monitoring or in-field testing • manufacturer information or manuals for environmental equipment • relevant case studies and good practice models
Project plans	Project plans may include: • purpose, scope, inclusions and exclusions • objectives, milestones, output/project deliverables and their acceptance criteria and quality standards • performance criteria/indicators, expected outcomes/measurable benefits and evaluation criteria • project management framework for: • planning, implementation, closure and governance • communications with stakeholders • cost estimates, budget and financial management • procurement and contract management • risk analysis and control measures • quality control and assurance procedures • occupational health and safety (OHS) requirements • record keeping and reporting • specific roles and responsibilities of team members • work breakdown structure, schedules and timeframes • available facilities and resources (e.g. equipment and personnel)
Project management tools	Project management tools may include: • project management software and tools, such as: • Gantt and bar charts • program and evaluation review technique (PERT) charts • critical path method • cost schedule control system • logistics support analysis • life cycle cost analysis

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	• spreadsheets • electronic and manual recording systems
Project information and data	Project information and data may include: • schedules, records of time spent and progress • costs, expenditure, invoices, payments, quotations and purchases • records of equipment used • emails and correspondence • records of consultations • sampling, monitoring, survey or in-field test data and results • progress reports and draft plans/procedures • project outputs • final reports/briefings/recommendations
Solutions to project problems	Solutions to project problems may include: • researching and applying models of good practice or relevant findings from case studies • seeking input from environmental specialists • reducing costs • seeking additional resources to meet deadlines • negotiating an extension to a deadline • redefining completion or quantity or quality of project outputs/outcomes • sharing ideas to generate improved work processes • changing roles and responsibilities within project team • outsourcing project components
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027011A Select, commission and maintain environmental monitoring instruments

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to provide fully functioning environmental monitoring instruments to implement an enterprise's environmental management plan and monitoring programs. This involves identifying the need for specific kinds of instruments, determining the suitability of available instruments, procuring and commissioning instruments, checking the serviceability and calibration of instruments, performing routine maintenance, training staff to operate instruments correctly, and maintaining relevant records.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation or rehabilitation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term 'manager' is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Procure suitable instruments	1.1	Determine the types and specifications of instruments required by the enterprise to implement the environmental monitoring program associated with site/project
		1.2	Research information about the features of instruments that may be suitable and their suppliers
		1.3	Liaise with suppliers and/or conduct tests to compare the stated performance of available instruments against enterprise specifications
		1.4	Seek advice/assistance with evaluating instruments if beyond own technical competence
		1.5	Select the most suitable instruments and arrange for their procurement
2	Commission new instruments	2.1	Use manufacturer documentation to develop a thorough understanding of instrument operation, functional test procedures, routine instrument checks and maintenance requirements
		2.2	Ensure that the instrument has been calibrated appropriately for intended use
		2.3	Conduct component checks and test measurements to confirm instrument performance for intended use
		2.4	Enter all required information about the new instrument in the enterprise information management system
		2.5	Develop and document clear procedures for

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			operating, caring for and maintaining the instrument
3	Train instrument operators	3.1	Identify the knowledge and skills required to operate the instrument safely and reliably in the workplace and to interpret the environmental parameters measured
		3.2	Develop an appropriate training program for instrument operators using established adult learning principles
		3.3	Ensure that each operator can use the instrument competently for the required measurement applications
		3.4	Record all training outcomes in accordance with regulator requirements and enterprise procedures
		3.5	Audit operator's use of instruments at regular intervals to ensure their ongoing competence
4	Maintain instruments fit for purpose	4.1	Conduct regular instrument checks and minor maintenance in accordance with enterprise procedures
		4.2	Check instrument calibration using specified standards and/or procedures and record all relevant information
		4.3	Troubleshoot basic faults and determine whether local repair/maintenance is technically possible and economic
		4.4	Arrange for repair or servicing from an accredited agent or other appropriate personnel in accordance with enterprise procedures
		4.5	Check instrument performance after repair/service before approving it for use
		4.6	Ensure all required instrument records are complete, accurate, legible and secure

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Required Skills and Knowledge

Required skills
Required skills include: • recognising common types of environmental monitoring instruments and the advantages, disadvantages and limitations of their use • locating, interpreting and comparing information about environmental monitoring instruments • selecting suitable instruments by analysing factors, such as intended use (fixed/portable, laboratory/field), range of parameters, accuracy, sensitivity, response time, robustness, serviceability and limitations • conducting pre-use and calibration checks, troubleshooting common faults, conducting basic repairs and maintaining the enterprise's monitoring instruments • safely operating the enterprise's monitoring instruments to obtain reliable data • processing and analysing measurement and uncertainty data • interpreting manuals and writing operating instructions for monitoring instruments • seeking advice when issues/problems are beyond scope of competence/responsibility
Required knowledge
Required knowledge includes: • environmental monitoring terms and concepts, and measurement parameters • procedures for conducting surveys, monitoring, sampling and in-situ measurements • instrumentation terms and concepts, such as operating voltage, accuracy, response time, sensitivity, detection limit, linearity and instrument uncertainty • characteristics, capabilities, limitations, function of key components and operating principles for monitoring instruments used in the enterprise • role and importance of regular calibration and pre-use checks and maintenance • common instrument faults, troubleshooting, recommended remedial actions and repairs • common instrument operator errors • relevant health, safety and workplace emergency response procedures

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and	Assessors must be satisfied that the candidate can

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evidence required to demonstrate competency in this unit	competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • selecting monitoring instruments that will enable the enterprise to successfully implement its environmental management plan • maintaining sufficient numbers of fully functioning instruments to satisfy the enterprise's predictable requirements • training instrument operators to use monitoring instruments safely and reliably • maintaining accurate and complete records.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with: • *MSS027000 series units dealing with coordination of specific environmental management activities (e.g. water, air and noise).* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • environmental management plans • environmental monitoring specifications, manuals and instruments • enterprise procedures for procurement of equipment and materials.
Method of assessment	The following assessment methods are suggested: • review of records of instrument selection, use and maintenance generated by the candidate • feedback from peers and manager that working instruments are available when required • review of instrument training materials/records generated by candidate • oral/written tests and calculations involving environmental parameters; set-up, calibration and basic maintenance of environmental monitoring instruments • observation of the candidate checking, using and

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	maintaining monitoring instruments and/or instructing others in their use. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Legislation, standards, codes, procedures and/or enterprise requirements	**Legislation, standards, codes, procedures and/or enterprise requirements may include:** • federal legislation, such as: • Environment Protection and Biodiversity Conservation Act 1999 • Australian Heritage Council Act 2003 • Native Title Act 1993 • state/territory government legislation and regulations and local government by-laws, policies, and plans dealing with: • land use, acquisition, planning and protection • environmental protection • cultural/heritage protection • vegetation management • nature conservation and wildlife/plant protection • water and water management • soil conservation • pollution and contaminated sites

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	• fisheries, forestry and mining operations • Australian and international standards, such as: • AS 3550 series Water analysis • AS/NZS 3580 series Methods for sampling and analysis of ambient air • AS/NZS 2922 Guide for the siting of sampling units (air monitoring) • AS 1055 series Acoustics - Description and measurement of environmental noise • AS IEC 61672.1:2004 Electroacoustics - Sound level meters - Specifications • AS IEC 61672.2:2004 Electroacoustics - Sound level meters - Pattern evaluation tests • AS IEC 60942:2004 Electroacoustics - Sound calibrators • AS/NZS 4323.3:2001 Stationary source emissions - Determination of odour concentration by dynamic olfactometry • environmental management plans, and site information about applicable legislative requirements and approval requirements • information about site processes and work schedules • monitoring/inspection procedures and management actions to prevent/control environmental impacts or risks • sampling and in-situ measurement procedures (e.g. water, air, noise and soils)
Environmental monitoring instruments	**Environmental monitoring instruments may include:** • water quality measuring instruments, such as: • specific meters or multi-probes for measuring water parameters, such as dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature • field test kits to determine water parameters, such as dissolved gases, chemical anions and cations, heavy metals, E. coli and biological oxygen demand (BOD) • portable colorimeters and field microscopes • air monitoring instruments, such as: • air sampling pumps, flow meters and sampling trains • continuous gas monitors • tapered element oscillating microbalance (TEOM) • portable gas monitors and analysers • weather stations • odour monitoring instruments, such as dynamic

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	olfactometers • noise monitoring instruments, such as: • type 1 and type 2 portable sound level meters • integrating and non-integrating sound level meters • noise dose meters • statistical analysers • sound monitoring stations • data loggers, recorders, telemetry equipment and global positioning system (GPS) • radiation instruments and survey meters, such as: • Geiger-Muller (beta and gamma) • scintillation (alpha, beta and gamma)
Environmental management plans	Environmental management plans provide a framework for managing all environmental aspects, impacts, risks and obligations relevant to a site, project or significant work activity. They may include: • an aim, vision and enterprise policy statement • roles and responsibilities • potential environmental issues • actions to avoid, remedy and mitigate the issues • procedures and forms to minimise and manage specific environmental impacts and risks • quality management plans • communication and training requirements • monitoring schedules, sampling/test procedures, and analysis and notification requirements (e.g. exceedance values and quality triggers) • auditing and reporting requirements
Environmental monitoring programs	Environmental monitoring programs may include surveys, sampling and measurements for: • establishing baseline or quality parameters • determining trends in parameters • investigating causes for changes in parameters • identifying and quantifying contamination at specific locations • identifying sources of possible/actual contamination • determining the effectiveness of environmental management plans, actions and control measures • determining the effectiveness of remediation activities
Specifications and features of	Specifications and features of instruments may include:

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instruments	• types of sampling and/or measurements to be performed • parameters or analytes of interest • detector type, sensitivity and detection limits • response time • linearity • estimated uncertainty for each range • single or multi-probe functions • ease of interfacing with data loggers and computers • power and battery requirements • size, weight, robustness and portability • instrument operating conditions
Adult learning principles	Adult learning principles may include: • explaining aims and objectives of training program • linking learning with everyday work tasks • using a logical sequence of learning activities • presenting new information in manageable chunks • providing opportunities to practise new skills and solve common problems • reinforcing important points • using a range of questions to check understanding • providing regular, constructive feedback
Regular instrument checks and minor maintenance	Regular instrument checks and minor maintenance may include: • cleaning • battery checks and replacement • zero, span and range checks • use of one or more references to check calibration/response in each range • adjustment of calibration if authorised to do so • simple fault-finding using instrument manual, error codes and recommended remedial actions
Required records	Required records may include details of: • purchase records, warranties and service agreements for instruments • instrument calibration status • instrument inspection (faults, servicing and repairs) • instrument use (operator, time/date, location) • instrument maintenance schedule and records
Occupational health and safety (OHS) and environmental	OHS and environmental management requirements:

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management requirements	• all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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MSS027012A Implement and maintain the site OHS management system

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the ability to implement and maintain the enterprise occupational health and safety (OHS) management system for a site or work group. Personnel work in accordance with enterprise OHS management policies, plans and procedures which incorporate all relevant aspects of OHS legislation and the codes, guidelines, regulations and Australian standards that apply to the site. This unit assumes that personnel have access to an enterprise manager and internal or external expert OHS advice.

Application of the Unit

This unit of competency is applicable to environmental site coordinators, environmental managers and senior environmental officers working in a range of industry sectors, such as:

- environmental monitoring, sampling and field testing (e.g. air, water, soil and noise)
- geotechnical services
- natural resource management
- occupational hygiene monitoring (e.g. air, noise and radiation)
- water supply and treatment, storm and wastewater management
- solid and hazardous waste management
- site remediation
- resource efficiency (e.g. energy, water and waste auditing).

Note that the term ‘manager’ is used to refer to management of a function, project and /or program and does not necessarily imply line management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MSL944001A Maintain laboratory/workplace safety

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Implement requirements for OHS management system	1.1	Ensure OHS responsibilities and duties are documented and accountability processes are in place
		1.2	Ensure OHS policies and procedures are documented and that documents are accessible to all relevant personnel
		1.3	Recognise limits of own expertise and consult manager and/or OHS specialists as necessary
2	Implement and maintain participative arrangements for OHS management	2.1	Implement and maintain appropriate participative processes with site personnel and their representatives in accordance with relevant OHS legislation and standards
		2.2	Provide information to site personnel in a format that is accessible and readily understood
		2.3	Deal with and resolve issues raised through participation and consultation promptly and effectively
		2.4	Provide information about the outcomes of participation and consultation to site personnel
3	Implement and maintain OHS risk management processes	3.1	Ensure hazard, incident and injury reporting and investigation processes are in place to meet prevention and legislative requirements
		3.2	Implement a process of hazard identification and

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			risk assessment
		3.3	Ensure risk controls and hazard specific procedures for risk control comply with legislation and the hierarchy of control
4	Implement and maintain OHS training programs	4.1	Conduct a training needs assessment for site personnel that takes account of legislative requirements, enterprise policies and procedures, and risk control requirements
		4.2	Develop and implement training programs to meet the OHS training needs of site personnel
5	Implement and maintain OHS record keeping system	5.1	Identify and address the legal requirements for record keeping
		5.2	Ensure that records are accurately completed, collected and stored
		5.3	Identify and access sources of OHS information
6	Initiate and maintain OHS management system improvements	6.1	Collect and analyse information to regularly evaluate OHS management system performance
		6.2	Recognise instances of non-conformance/non-compliance and identify opportunities for improving performance
		6.3	Initiate authorised improvements in consultation with appropriate personnel and update system documentation
		6.4	Monitor the effectiveness of system modifications in consultation with site personnel
7	Keep management informed about OHS performance	7.1	Provide regular reports about OHS performance, instances of potential/actual non conformance and incidents and the actions taken in each case
		7.2	Report opportunities and recommendations for system improvements in accordance with

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enterprise procedures

7.3 Report implementation and effectiveness of system modifications

Required Skills and Knowledge

Required skills
Required skills include: • accessing and interpreting OHS legislation, regulations, codes of practice and updates • analysing the work environment and assessing the need for OHS interventions • consulting site personnel about safety issues, hazard identification, risk assessment, selection and implementation of control measures and their review • raising issues related to concerns with safety of work systems and work environment through consultation with management and site personnel • addressing OHS management issues within scope of responsibility • developing and implementing improvements in work practices and procedures • providing appropriate supervision, support and information in accordance with enterprise procedures • keeping complete, current and secure OHS records • communicating effectively with site personnel, managers and OHS specialists • preparing OHS reports for site, section or work area • working safely for the protection of self and others
Required knowledge
Required knowledge includes: • roles and responsibilities of employers and employees under OHS legislation, including managers/supervisors and contractors • legislative requirements for OHS information and consultation • standards relating to OHS management systems • regulator's guidelines for OHS management systems • enterprise record keeping requirements that address OHS, privacy and other relevant legislation • enterprise OHS and management policies and procedures, plans, housekeeping, inspections, audits • key personnel within enterprise management structure and OHS management systems • participative consultation processes relating to OHS management systems • enterprise purchasing policy and procedures for safety related supplies and equipment

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- sources of OHS management information, including specialist advisors
- principles and practices of effective OHS management (e.g. hazard identification, risk assessment and risk control) and the hierarchy of control
- definition of risk as the chance of something happening that will result in injury or damage measured in terms of consequences and likelihood
- definition of risk management as the whole systematic process that is directed towards identifying hazards, assessing the risk, developing controls to minimise the risk, monitoring the effectiveness of the controls and taking action as required
- nature of site safety hazards and risks and existing control measures
- how the characteristics and composition of the workforce impact on OHS management

Evidence Guide

Overview of assessment	Competency must be demonstrated in the ability to perform consistently at the required standard.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations. Critical aspects of assessment and evidence include: • accessing and interpreting relevant sections of OHS legislation, regulations, codes of practice and updates • analysing the work environment and assessing the need for OHS interventions • consulting employees and other stakeholders on safety issues, hazard identification, risk assessment, selection and implementation of control measures and their review • raising issues related to concerns with safety of work systems and work environment through consultation with management, employees and contractors • promptly addressing OHS management issues within their area of control • developing and implementing improvements in work practices and procedures to reduce the risk of illness and injury and meet OHS legislative requirements • providing appropriate supervision, support and information in accordance with enterprise procedures • keeping OHS records complete, current and secure • communicating effectively with personnel at all levels of the organisation and OHS specialists

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	• preparing reports for a range of target groups, including OHS committee, OHS representatives, managers and supervisors.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or a simulated workplace environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace. This unit of competency may be assessed with units dealing with communication, supervision and training, for example: • *MSS027001A Coordinate environmental management activities.* The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. Resources may include: • relevant OHS legislation and regulations • codes of practice • enterprise procedures.
Method of assessment	The following assessment methods are suggested: • review of OHS information developed by the candidate and provided to the site personnel • review of OHS records and reports prepared by the candidate • feedback from site personnel and managers regarding provision of information and the candidate's ability to implement and monitor established OHS management systems • written and/or oral questioning to assess underpinning OHS knowledge and likely response to simulated incidents. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like

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	environment.
Guidance information for assessment	

Range Statement

Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Standards. codes, procedures and/or enterprise requirements	Standards. codes, procedures and/or enterprise requirements may include: • Australian and international standards, such as: • AS 1678 series Emergency procedure guide - Transport • AS 1940:2004 Storage and handling of flammable and combustible liquids • AS 3780:2008 The storage and handling of corrosive substances • AS/NZS 1269 Set:2005 Occupational noise management set • AS/NZS 1337 series Eye protection • AS/NZS 2161 Set:2008 Occupational protective gloves set • AS/NZS 2210:1994 Occupational protective footwear • AS/NZS 2865 Set:2005 Safe working in a confined space set • AS/NZS 4452:1997 The storage and handling of toxic substances • AS/NZS 4501 Set:2008 Occupational clothing set • AS/NZS ISO 14000 Set:2005 Environmental management standards set • HB 9-1994 Occupational personal protection • Australian Dangerous Goods Code • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice • contractor and employee handbooks • emergency, fire and incident procedures • environmental incident procedures • hazard policies and procedures

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	• hazardous goods manifest and substance register • maintenance schedules • manufacturer operating manuals • National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)] • national environment protection measures • National Health and Medical Research Council (NHMRC) Guidelines • OHS national standards and codes of practice • personal protective clothing and equipment procedures • safety procedures • standard operating procedures • work instructions
Site personnel	Site personnel may include: • managers and supervisors • health and safety and other employee representatives • contractors, consultants and visitors • OHS committee members • operations personnel • external OHS agency representatives
Participative processes with site personnel and their representatives	Participative processes with site personnel and their representatives may include: • committees: • OHS • consultative • planning • employee and supervisor/manager involvement in OHS activities, such as inspections, audits and risk assessments • procedures for reporting hazards and raising and addressing OHS issues • identification of hazards • assessment of level of risk • implementation of risk control measures and review of effectiveness • injury and incident investigations • development of policies and procedures • review of OHS records and statistics • review of registers of hazardous substances and dangerous goods • audits and workplace inspections

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	• job safety analysis • consultation with site personnel
Characteristics and composition of the workforce which have an impact on OHS and environmental management	Characteristics and composition of the workforce which have an impact on OHS and environmental management may include: • language and literacy • communication skills • cultural background • gender • workers with special needs • part time, casual or contract workers
Hazard identification processes	Hazard identification processes include: • review of hazard and incident reports • workplace inspections • pre-purchase risk assessments • review of relevant internal documentation, including material safety data sheets (MSDS), manufacturer manuals and minutes of meetings • review of legislation, codes of practice, standards and guidelines • review of publications, such as: • OHS regulators • industry bodies • journals • newsletters
Risk assessment	Risk assessment is a process that involves analysing the risk to identify factors influencing the risk and the range of potential consequences and assessing: • effectiveness of existing controls • likelihood of each consequence considering exposure and hazard level • combining these in some way to obtain a level of risk A complete risk assessment will also include comparison of the determined risk with pre-established criteria for tolerance (or as low as reasonably achievable) and the subsequent ranking of risks requiring control
Hierarchy of control	Hierarchy of control, also referred to as the 'safety decision hierarchy' describes the preferred order of risk control measures from most to least preferred, that is: • elimination, or where this is not practical

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	• substitution with a lesser hazard • isolate personnel from hazard • engineering controls • administrative controls, such as enterprise procedures and training • personal protective equipment
Information for evaluation of the OHS management system	Information for evaluation of the OHS management system may include: • hazard, incident and injury reports • site inspections • audit reports • formal and informal input of employees and contractors
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Environmental

Custom Content Section

Not applicable.

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RIIPRM501A Implement, monitor, rectify and report on contracts

Modification History

Not applicable.

Unit Descriptor

This unit covers the implementation, monitoring, rectifying and reporting on contracts in the resources and infrastructure industries. It includes implementation, monitoring and reporting administrative procedures, monitoring contract time frame and specifications, resolving contractual disputes and implementing contract completion. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in a management or supervisory role at worksites within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the	Performance criteria describe the performance needed to

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essential outcomes of a unit of competency.	demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Implement, monitor and report administrative procedures	1.1. Access, interpret and apply ***compliance documentation*** relevant to the work activity 1.2. Implement ***contract administration*** procedures for reviewing ***contract performance*** against performance criteria 1.3. Implement procedures for monitoring and rectifying performance 1.4. Develop and implement procedures for adjusting performance where performance does not meet contractual requirements
2. Monitor contract time frame and specifications	2.1. Undertake regular inspection of contract services to ensure compliance with contract specifications 2.2. Identify and document variations between the specified scope of services and the contract, and notify relevant personnel 2.3. Carry out ***testing*** of services in progress by the contractor in accordance with legislative, regulation and worksite requirements
3. Resolve contractual disputes	3.1. Investigate disagreements to identify cause and validity 3.2. Negotiate and agree terms of resolution 3.3. Follow contracted prescriptions for dispute resolution 3.4. Seek specified advice to resolve disputes 3.5. Seek appropriate technical/legal advice to clarify dispute issues
4. Implement contract completion	4.1. Review ***contract conditions*** and responsibilities with appropriate personnel to ensure satisfactory completion 4.2. Report contract completion to appropriate

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	personnel 4.3. Evaluate contract performance against agreed benchmarks

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following as required to implement, monitor, rectify and report on contracts:

- apply legislative, organisation and site requirements and procedures for implementing, monitoring, rectifying and reporting on contracts
- access, interpret and apply technical information and briefings to other staff
- apply the principles of contract management
- assess the risks and the hazards attached to contract management
- develop procedures appropriate to site operations for management of contracts
- plan and coordinate work
- identify training needs related to contract management
- interpret and apply contract specifications
- conduct testing of contracted services and products

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following as required to implement, monitor, rectify and report on contracts:

- legislative and statutory requirements and the instructions relating to contract maintenance
- site operation procedures
- site design relating to contracted services
- contract management requirements
- risk management procedures
- inspection and testing of contracted services / products
- site reporting procedures
- review processes and techniques
- knowledge of contract design criteria
- training programs

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• computer based systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for implementing, monitoring, rectifying and reporting on contracts • implementation of procedures and techniques for the safe, effective and efficient implementation, monitoring, rectification and reporting on contracts • the identification of the relevant information and scope of the work required to meet the required outcomes • the identification of viable options and the selection of processes to implement, monitor, rectify and report on contracts that best meet the required outcomes • working with others to undertake and complete the implementation, monitoring, rectification and reporting on contracts • consistent successful implementation, monitoring, rectification and reporting on contracts
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency

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	management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment should sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge in undertaking the implementation, monitoring, rectification and reporting on contracts
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate requirements, procedures and techniques for the safe, effective and efficient achievement of required outcomes
	  • identification of the relevant information and scope of the work required to meet the required outcomes
	  • identification of viable options and the selection of processes for implementation, monitoring, rectification and reporting on contracts that best meet the required

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	outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and complete the implementation, monitoring, rectification and reporting on contracts • provision of clear and timely required support and advice on the implementation, monitoring, rectification and reporting on contracts
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Contracts may be for :	• products • maintenance contracts • supply contract • cleaning contracts • waste removal contracts • plant and equipment commissioning and decommissioning contracts • equipment supply contracts • other worksite requirements

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Administration may include:	• supervision • management • monitoring • overseeing
Contract performance is evaluated in terms of:	• adherence to time lines • costs • progress towards objectives • adherence to quality standards • occupational health and safety standards
Testing may include:	• sampling • routine checks • audit • observation • meetings • occupational health and safety checks
Contract conditions may include:	• tender documentation • maintenance plans • defects liability

Unit Sector(s)

Project Management

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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RIINHB408A Supervise environmental drilling operations

Modification History

Not applicable.

Unit Descriptor

This unit covers the supervision of environmental drilling operations in resources and infrastructure industries. This includes: planning and preparing for operations; initiating the operations; and monitoring, adjusting, communicating and reporting on the execution of the operations.

Application of the Unit

This unit is appropriate for those working in a supervisory role or as a technical specialist, within:

- Civil construction
- Coal mining
- Drilling
- Extractive industries
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent

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	with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for environmental drilling operations	1.1. Access, clarify and ensure the application of the ***requirements and procedures*** relevant to undertaking ***environmental drilling operations*** 1.2. Access, clarify and ensure the application of the specific ***task information*** and ***required outcomes*** relevant to undertaking environmental drilling operations 1.3. Prepare an ***operational plan*** which makes best use of the available ***resources*** and for the safe effective and efficient conduct of the operations
2. Initiate environmental drilling operations	2.1. Acquire and make available the necessary resources for the safe, effective and efficient conduct of the operations 2.2. Issue clear and timely ***instructions*** to ***team members*** and others involved, for the safe, effective and efficient conduct of the operations
3. Monitor, adjust, communicate and report on the execution of environmental drilling operations	3.1. ***Monitor*** the execution of environmental drilling operations 3.2. ***Initiate*** adjustments to ***environmental drilling operations practice*** or the operational plan to ensure safe, effective and efficient execution of the operations 3.3. Provide advice to ***team members*** to overcome ***operational problems*** encountered during the execution of environmental drilling operations. 3.4. Ensure plant equipment and tools maintenance requirements are carried out and recorded 3.5. Ensure reports are completed and submitted 3.6. Recommend changes to improve the safety, efficiency and effectiveness of the execution of environmental drilling

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	operations.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria of this unit, particularly for their application in the variety of circumstances in which this unit may be applied. This includes the ability to carry out the following:

- interpreting legislative requirements and procedures
- interpreting organisational requirements and procedures
- interpreting client requirements and procedures
- interpreting manufacturer's requirements and procedures
- interpreting environmental drilling operations project site geological data
- interpreting environmental drilling operations project site geotechnical data
- interpreting environmental drilling operations project site hydrological data
- interpreting environmental drilling operations project site metrological data
- interpreting environmental drilling operations project engineering survey information
- interpreting environmental drilling operations project plans and drawings
- interpreting environmental drilling operations project specifications
- preparing for and conducting of briefings, toolbox and site meeting
- preparing of short messages
- preparing and presenting of job reports
- preparing and maintaining of log books and diaries
- providing leadership
- applying environmental drilling operations performance monitoring skills
- applying environmental drilling operations troubleshooting skills
- applying environmental drilling operations problem solving skills
- performing calculations for the execution of environmental drilling operations
- providing recommendations for the improvement of the safe, effective and efficient execution of environmental drilling operations

Required knowledge

Specific knowledge is required to achieve the performance criteria of this unit, particularly for their application in the variety of circumstances in which this unit may be applied. Assessment requires evidence of the ability to identify and explain the purpose of:

- risk assessment and management requirement and procedures

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- statutory compliance requirements and procedures
- occupational safety and health requirements and procedures
- environmental management requirements and procedures
- quality management requirements and procedures
- work zone traffic management requirements and procedures
- contract management requirements and procedures
- communication requirements and procedures
- administrative requirements and procedures
- environmental drilling operations plant and equipment capabilities and application
- plant, equipment and tools maintenance requirements and procedures
- operational techniques for the execution of environmental drilling operations
- potential operational problems in the execution of environmental drilling operations
- environmental drilling operations resource requirements and procedures
- activities scheduling requirements and procedures
- environmental drilling operations materials delivery requirements and procedures
- job plan drafting of and administration requirements and procedures
- reporting requirements and procedures
- workplace relationship requirements and procedures
- organisational, client and site operational requirements
- relationship between various areas of resources and infrastructure activities and environmental drilling operations
- team leadership techniques
- works planning techniques
- environmental drilling operations monitoring methods

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the Performance Criteria, Required Skills and Knowledge and the Range Statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions that are to apply in undertaking

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	environmental drilling operations • implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes of environmental drilling operations • working with others to plan, prepare and execute environmental drilling operations • operational plans which reflect the requirements of these environmental drilling operations and are capable of achieving all of their required outcomes • resource plans which have made available adequate resources for the safe, effective and efficient execution of environmental drilling operations • provision of clear and timely instruction, advice and supervision by the individual of those involved in the undertaking of these environmental drilling operations • evidence of the consistent successful completion of environmental drilling operations under their supervision
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection

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	and use of resources for particular worksites may differ due to the site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.

Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods:
	• written and/or oral assessment of the candidate's required knowledge
	• observed, documented and/or first hand testimonial evidence of the candidate's:
	  • implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes of environmental drilling operations
	  • operational plans which reflect the requirements of environmental drilling operations and are capable of achieving all of their required outcomes
	  • resource plans which have made available adequate resources for the safe, effective and efficient execution of environmental drilling operations
	  • consistent successful completion of environmental drilling operations under their supervision
	• first hand testimonial evidence of the candidate:
	  • working with others to plan, prepare and execute environmental drilling operations
	  • supervising and providing clear and timely instruction and advice to those involved in the undertaking environmental drilling operations

Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and

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	equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Requirements and procedures may include:	• legislative • organisational • client • site • manufacturer's ***and may include***: • risk assessment and management requirements and procedures • statutory compliance requirements and procedures • occupational safety and health requirements and procedures • environmental management requirements and procedures • cultural and heritage requirements and procedures • traffic management requirements and procedures • quality requirements and procedures • communication requirements and procedures • procurement requirements and procedures • workplace relations requirements and procedures • contract management requirements and procedures • administration requirements and procedures, including records and reporting • maintenance, servicing, and housekeeping requirements and procedures • Employment and workplace relations legislation

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	• Equal Employment Opportunity and Disability Discrimination legislation
Environmental drilling methods may include:	• air drilling • continuous flight auger drilling • large diameter auger drilling • conventional core drilling • wire-line core drilling • mud rotary drilling • monitoring bores
Task information may include:	• site geological data • site geotechnical data • site hydrological data • site meteorological data • site engineering survey data • known and potential site hazards, constraints and conditions • site cultural and heritage information • task specifications • task drawings • sources of materials • other organisations and contractors involved in the task or related • coordination, timing and budgeting requirements
Required outcomes may include:	• task specifications requirements • task drawings requirements • coordination requirements • activity scheduling requirements • unit cost requirements • overall operation cost requirements • waste management requirements
Operational plan may include:	• human resource requirements • plant and machinery requirements • construction materials requirements • sub-contractor support requirements • waste disposal requirements • coordination requirements • activity scheduling • materials delivery scheduling • risk assessment and management requirements • occupational health and safety requirements • quality management requirements, including

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	testing scheduling requirements • traffic management requirements • environmental requirements • operation monitoring requirements • operation performance monitoring requirements • communication requirements • reporting requirements
Resources may include:	• labour • plant, equipment and tools • highway haulage vehicles • construction materials • sub-contractor services
Instructions may include:	• briefings • handovers • work orders • toolbox meetings • site meetings
Teams members may include:	• other members of the organisations management team • members of the team directly involved in the operation • supplier's representatives • sub-contractor's representatives • supervisors or managers of other organisations who are involved in related operations
Monitor may include:	• ongoing risk assessment • engineering survey • sampling and testing • observation and recording • general supervision
Initiate may include:	• written communication • oral communications
Environmental drilling operations may include:	• hole drilling techniques • identification of and responding to operational problems • equipment maintenance
Operational problems may include:	• handling and disposal of contaminated samples or waste • drilling without the aid of drilling fluid additives • keeping hole open to install screens and

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	monitoring equipment • equipment failure • drill string bogging or breaking • drilling in difficult ground (caving, porous, fractured, reactive, cavities, fill material)

Unit Sector(s)

Drilling (General)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.

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PUAWER010B Lead a workplace emergency initial response team

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the competency required to lead a workplace emergency initial response team in the control of workplace emergencies in their early stages prior to the arrival of emergency services or specialist response teams.

This unit:

- has been developed to cover the broad range of ***emergencies*** and ***workplaces*** as considered in Australian Standard 37452002
- is part of a suite of eleven workplace emergency response units of competency that has three streams
- is part of the initial response stream.

Application of the Unit

Application of the Unit

The application of this unit in the workplace - the environments, complexities and situations involved - will be written during Phase II of the Review of the PUA00 Public Safety Training Package.

This text will be useful for the purposes of job descriptions, recruitment advice or job analysis; where possible, it will not be too job specific to allow other industries to import it into other Training Packages, where feasible.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite Unit/s	PUAWER009B Participate as a member of a workplace emergency initial response team

Employability Skills Information

Employability Skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare the team for workplace emergencies**	1.1 ***Pre-incident planning*** sessions are conducted to familiarise team members with relevant workplace procedures and safe and effective actions to control workplace emergencies according to relevant legislative requirements 1.2 Processes are developed and implemented to ensure the competence of team members is developed and maintained 1.3 Discussions, practice drills and exercises are conducted in accordance with workplace emergency procedures 1.4 ***Emergency equipment*** is confirmed to be in a serviceable and accessible condition in

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ELEMENT	PERFORMANCE CRITERIA
	accordance with standard/operating procedures
2. **Coordinate the response to control workplace emergencies**	2.1 Initial response team is made aware of the workplace emergency
	2.2 Team's response to the emergency is coordinated according to workplace emergency procedures, risk assessment and available resources
	2.3 Situation and its likely development is constantly assessed, ***hazards*** are identified and appropriate ***precautions*** are applied and maintained to safeguard team members
	2.4 Appropriate actions to safely control the emergency are selected, and ***contingency plans*** are developed and implemented if needed
	2.5 Instructions to implement selected actions are conveyed to team members in a clear manner and confirmed with them
	2.6 Actions chosen for the team to implement are consistent with available resources and the priority order of safely protecting self, other people and property where safe to do so
	2.7 Team actions are monitored, recorded and adjusted if needed to ensure safe and appropriate action is maintained
3. **Communicate with and coordinate personnel**	3.1 Effective communication with team members is constantly maintained according to communication systems
	3.2 Activities are consistent with the workplace emergency procedures and team members' actions are coordinated
	3.3 Team members' actions are coordinated with the activities of ***other initial response teams***
	3.4 On arrival incident controller is briefed and control is transferred to the appropriate emergency services/specialist response team
	3.5 Liaison is established with the responding emergency services or specialist response team, and all relevant information and support is provided to them
4. **Lead team's recovery from workplace emergencies**	4.1 Team actions are coordinated to prevent a re-occurrence of the emergency and to enable recovery activities to be commenced safely
	4.2 Appropriate assistance is coordinated, within the

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ELEMENT	PERFORMANCE CRITERIA
	scope of the workplace emergency procedures 4.3 Equipment is checked, serviced and stored, replaced or disposed of, to ensure its readiness for use 4.4 Any injuries, accidents or near misses involving the team are reported and critical incident support services for the team are requested in accordance with relevant regulatory requirements 4.5 A debriefing of the team is conducted and an incident report is prepared and submitted according to workplace procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required Skills

- coordinate the use of emergency equipment safely and effectively under emergency conditions
- leadership and communication skills during emergencies

Required Knowledge

- alarm systems and associated equipment
- appropriate personal protective clothing and equipment
- building fire safety features
- dealing with contingencies
- equipment operating characteristics, limitations, hazards, precautions, procedures and general care
- general emergency priorities and strategies
- hazards and relevant precautions
- how people react in emergency situations
- procedures for responding to alarms
- risk assessment
- roles, responsibilities and authority of emergency services personnel
- situational awareness
- survival, rescue and recovery procedures
- tactics for safely handling specific emergencies

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REQUIRED SKILLS AND KNOWLEDGE

- workplace emergency management plan

Evidence Guide

EVIDENCE GUIDE

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessment must confirm the ability to lead a safe and prompt response to a workplace emergency; to constantly assess the situation, identify hazards, apply and coordinate appropriate precautions; to select, implement and coordinate safe and effective actions by the team; to support the responding emergency services or specialist response teams; and to complete appropriate reports **Consistency in performance** Competency should be demonstrated over time with a range of emergencies that could be expected in the workplace, including dealing with plausible contingencies while leading a team
Context of and specific resources for assessment	**Context of assessment** Competency should be assessed in a simulated environment under conditions that safely replicate a range of workplace emergency situations **Specific resources for assessment** Access to: • scenarios that reflect emergency situations that may be expected in the workplace • workplace emergency initial response equipment
Guidance information for assessment	Information that will assist or guide assessment will be written during Phase II of the Review of the PUA00 Public Safety Training Package.

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Range Statement

RANGE STATEMENT

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

Emergency services or specialist response teams may include	Ambulance/medical services Coast guard Defence workplace response teams Fire services Organisational specialist response team Police services Relevant state/territory and commonwealth authorities (such as environmental protection) Rescue services Organisations identified as response or support agencies as defined in the appropriate state/territory and/or commonwealth legislation Other external agencies such as hazmat teams, bomb squads, animal rescue services
Emergencies must include those emergencies identified by the workplace hazard analysis, which may include	Animal or livestock emergencies Bomb threat Building invasion/armed invasion Chemical, biological and radiological Civil disorder Criminal acts Cyclones, including storm surge Deliberate self-harm Earthquake Failure of utilities Fire Flood Hazardous substances incidents Hostage situations Industrial accident

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RANGE STATEMENT

	Letter bomb
	Medical emergency
	Severe weather/storm damage
	Structural instability
	Terrorism
	Transport accident
	Toxic emission
	Veterinary emergencies
	Wildfire
Workplaces include	Workplaces, buildings and structures as outlined in Australian Standard 37452002
Pre-incident planning may include	Contingency plans, sketches or notes about workplace layout, features, hazards and emergency control facilities
	Discussions and/or use of operational procedures involving emergency plans, sketches, notes, procedures or material safety data sheets
Emergency equipment may include	Emergency vehicles, trailers, trolleys or caches
	Fire protection equipment
	Forcible entry tools
	Life support equipment
	Monitors (or turrets)
	Personal protective clothing and equipment
	Rescue equipment
	Spill or leak control kits
Initial response team may be made aware of the emergency through an alerting system such as	Computer screen alert
	Emergency warning system
	Fire alarm system
	Radio, telephone or pager system
Hazards may include	Chemical, biological, radiological
	Climatic
	Electrical

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RANGE STATEMENT

	Environmental Explosive Fire Mechanical Psychological (eg critical incident stress) Noise related Security related Storm/flood Structural Thermal Wildlife related
Precautions may include	Risk controls developed by using the hierarchy of controls, also called the safety decision hierarchy, with the priority being in order of: • eliminate the hazard • substitute with a lesser hazard • isolate the hazard • engineer controls i.e. guarding • implement procedures to minimise risk • use appropriate personal protective equipment
Contingency plans may include provision for	An unexpected threat to team member safety Communications problems Failure of emergency control equipment Injury to a team member Loss of emergency supplies Unexpected development of the emergency Team leader being injured or not being available
Other initial response teams may include	Damage control Emergency control organisation Fire team First aid Maintenance Security

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RANGE STATEMENT

Unit Sector(s)

Not applicable.

Corequisite Unit/s

Co-requisite Unit/s Nil

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MSL944001A Maintain laboratory/field workplace safety

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to monitor and maintain occupational health and safety (OHS) and environmental programs within a work area where the person has supervisory responsibility for others.

Application of the Unit

Application of the unit	This unit is applicable to laboratory technicians, senior technicians and laboratory managers in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Perform all work safely	1.1. Use established work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 1.2. Clean, care for and store equipment, materials and reagents as required 1.3. Minimise the generation of wastes and environmental impacts 1.4. Ensure safe disposal of laboratory/hazardous wastes
2. Ensure others in the work group are able to implement safe work practices	2.1. Ensure hazard controls and personal protective clothing and equipment appropriate to the work requirements are available and functional 2.2. Provide and communicate current information on OHS and environmental policies, procedures and programs to others 2.3. Ensure hazards and control measures relating to work responsibilities are known by those in the work area 2.4. Provide support to those in the work area to implement procedures to support safety 2.5. Identify and address training needs within level of responsibility
3. Monitor observance of safe work practices	3.1. Ensure enterprise procedures are clearly defined, documented and followed

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ELEMENT	PERFORMANCE CRITERIA
in the work area	3.2. Identify any deviation from identified procedures and report and address within level of responsibility 3.3. Ensure personal behaviour is consistent with enterprise policies and procedures 3.4. Encourage and follow up others to identify and report hazards in the work area 3.5. Monitor conditions and follow up to ensure housekeeping standards in the work area are maintained
4. Participate in risk management processes	4.1. Report and address any identified hazards and inadequacies in existing risk controls within level of responsibility and according to enterprise procedures 4.2. Participate in risk assessments to identify and analyse risks 4.3. Support the implementation of procedures to control risk (based on the hierarchy of control) 4.4. Ensure records of incidents in the work area and other required documentation are accurately completed and maintained according to enterprise procedures and legislative requirements
5. Support the implementation of participative arrangements	5.1. Inform and consult work group on OHS and environmental issues relevant to the work role 5.2. Promptly report outcomes of consultation on OHS and environmental issues back to the work group 5.3. Resolve, or promptly refer to appropriate personnel, matters raised relating to OHS and the environment
6. Support the implementation of emergency procedures within the work group	6.1. Ensure that enterprise procedures for dealing with incidents and emergencies are available and known by work group 6.2. Implement processes to ensure that others in the work area are able to respond appropriately to incidents and emergencies 6.3. Participate, as required, in investigations of hazardous incidents to identify their cause

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
Required skills include: • performing all work safely • following procedures for hazard identification and risk control • ensuring others in the team are able to implement safe work practices • preparing brief reports for a range of target groups, including OHS committees, OHS representatives, managers and supervisors
Required knowledge
Required knowledge includes: • definition of hazard, physical hazard, risk and risk management • hazards commonly found in the work area and standard risk controls • signage, symbols and signals relating to OHS • location and purpose of personal protective equipment and emergency/hazard control equipment in the work area, including first aid facilities and personnel • use, care and storage requirements for personal protective clothing and equipment used in work areas • roles and responsibilities under OHS legislation of employers and employees, including supervisors and contractors • requirements for record keeping that address OHS, privacy and other relevant legislation • principles and practices of effective OHS management, including hazard identification, risk assessment and risk control • the hierarchy of control • enterprise procedures for OHS and environmental management • key personnel within enterprise management structure and the OHS management system • sources of OHS information, including specialist advisors • the elements of an OHS management system which includes that part of the enterprise's overall management system for developing, implementing, reviewing and maintaining the activities for managing OHS risks associated with their business • how the characteristics and composition of the workforce impact on OHS management

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • work safely at all times • ensure others in the workgroup work safely and follow OHS and environmental policies and procedures for hazard identification and risk control • communicateOHS and environmental issues with designated personnel • ensure that enterprise procedures for dealing with incidents and emergencies are available and known by work group • communicate effectively with personnel at all levels within the enterprise and OHS specialists • prepare brief reports for a range of target groups.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. Resources may include: • laboratory/field work environment, equipment and materials • personal protective equipment and safety equipment • enterprise OHS management system, policies and procedures.
Method of assessment	The following assessment methods are suggested: • feedback from peers and supervisors • review of documentation prepared by candidate, such as OHS committee minutes, risk assessments and incident reports • written and/or oral questioning to assess underpinning knowledge of principles and practices of effective OHS management and the enterprise's OHS management system, OHS policies and procedures • observation of the candidate preparing for and undertaking a range of work tasks. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those

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EVIDENCE GUIDE	
	aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Education** A technical officer working for a university biology school assists honours and final year undergraduate students to perform their own experiments. The students discuss what technical work they want to do with the technical officer and what reagents and equipment will be needed. The technical officer provides MSDS and other information to the student. He/she also conducts a risk assessment to identify and analyse the risks, selects appropriate controls and outlines the risk management process to be used. In some cases, the toxicity of mixtures and the waste generated by experiments may pose an unacceptable level of risk and the technical officer will suggest safer alternatives.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and

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RANGE STATEMENT	
regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 2252 Biological safety cabinets
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	• AS/NZS 1269 Set:2005 Occupational noise management set
	• AS/NZS 1337 Eye protection
	• AS/NZS 2161 Set:2008 Occupational protective gloves set
	• AS/NZS 2210:1994 Occupational protective footwear
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	• AS/NZS 4501 Set:2008 Occupational clothing set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australian Dangerous Goods Code
	• Australian Quarantine and Inspection Service (AQIS) Import Guidelines
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice

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RANGE STATEMENT	
	• gene technology regulations • Guide to physical containment levels and facility types • National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)] • OHS national standards and codes of practice
Hazards	Hazards may include: • electric shock • microbiological organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as acids, heavy metals, pesticides and hydrocarbons • aerosols from broken centrifuge tubes and pipetting • radiation, such as alpha, beta, gamma, X-ray and neutron • sharps, broken glassware and hand tools • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam, hydrogen in gas liquid chromatography and acetylene in atomic absorption spectrometry • sources of ignition • high temperature ashing processes • disturbance or interruption of services • occupational overuse syndrome, slips, trips and falls • manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects • pedestrian and vehicular traffic • vehicle and boat handling • factors, such as inadequate work practices, lack of training or fatigue are not hazards but are conditions that may result in the loss of control of the hazard and cause injury or damage

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RANGE STATEMENT	

Addressing hazards	Addressing hazards may include:
	• hazard and incident reporting and investigation procedures
	• elimination
	• substitution, such as review of nature of substances or processes used
	• isolation:
	  • use of appropriate equipment, such as biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets
	  • Class PCII, PCIII, and PCIV physical containment laboratories
	• engineering
	• administrative procedures, such as:
	  • ensuring access to service shut-off points
	  • recognising and observing hazard warnings and safety signs
	  • labelling of samples, reagents, aliquoted samples and hazardous materials
	  • handling and storing hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions
	  • identifying and reporting operating problems or equipment malfunctions
	  • cleaning and decontaminating equipment and work areas regularly using enterprise procedures
	  • applying containment procedures
	  • following established manual handling procedures for tasks involving manual handling
	  • using appropriate equipment and procedures to avoid personal contamination and contamination of others
	  • following risk control measures to minimise environmental hazards
	  • using practices which minimise waste
	  • reporting to appropriate personnel of abnormal emissions, discharges and

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RANGE STATEMENT	
	airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates • minimising exposure to radiation, such as lasers, electromagnetic and ultraviolet • using MSDS • using signage, barriers and service isolation tags • using personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots
Enterprise policies, procedures and programs include those that directly or indirectly cover OHS and environmental issues	Enterprise policies, procedures and programs include those that directly or indirectly cover OHS and environmental issues, such as: • hazards and control measures • minimisation of environmental threats • minimisation and disposal of waste • standard operating procedures (SOPs), work instructions, laboratory manuals, operator's manuals and manufacturers' operating manuals • safety, emergency, fire and other incidents • selection and use of personal protective clothing and equipment • reporting of hazards and incidents • consultation and issue resolution • risk management • contractor and employee handbooks • formulas and batch sheets • industry codes of practice and guidelines
Risk assessment	Risk assessment includes: • analysing the risk • identifying factors influencing the risk and the range of potential consequences • effectiveness of existing controls • likelihood of each consequence considering exposure and hazard level • combining these in some way to obtain a level of risk

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RANGE STATEMENT	
	• comparison of the determined risk with pre-established criteria for tolerance (or as low as reasonably achievable) and the subsequent ranking of risks requiring control

Hierarchy of control	Hierarchy of control includes:
	• the preferred order of risk-control measures from most to least preferred, that is:
	  • eliminating risk
	  • substituting with a lesser hazard
	  • isolating personnel from hazard
	  • engineering controls
	  • applying administrative controls (e.g. procedures and training)
	  • using personal protective equipment

OHS and environmental issues	OHS and environmental issues may include: • identification of hazards • assessment of risk and decisions on measures to control risk • risk reduction measures • implementation of controls • investigation of injury and incidents • hazards not otherwise addressed • problems in implementing risk controls • incidents • clarification of policies or procedures
Consultation with the workgroup on OHS and environmental issues	Consultation with the workgroup on OHS and environmental issues may involve: • following OHS procedures and environmental risk control measures • information sessions on existing or new issues • meetings between employer and employees or representatives • access to relevant workplace information • use of clear and understandable language • provision for non-English speaking personnel • provision for hearing-impaired personnel • awareness of databases and online software for the inventory, manifest and information retrieval regarding hazardous materials

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RANGE STATEMENT	
	• formal arrangements, such as health and safety committees and health and safety representatives (where appointed) • informal arrangements, such as toolbox meetings and coffee breaks
Incidents and emergencies	Incidents and emergencies may include: • workplace injury and accidents • biological and chemical spills • leakage of radioactivity • fire • bomb threat • security threat
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Occupational health and safety

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSAENV672A Develop workplace policy and procedures for sustainability

Modification History

Unit Descriptor

This competency covers the outcomes required to develop and implement a workplace sustainability policy, including the modification of the policy to suit changed circumstances.

This unit is based on the sustainability guideline standard GCSSUS03A Develop workplace policy and procedures for sustainability.

Application of the Unit

This competency applies to team leaders/supervisors/managers who are required to develop approaches to sustainability within workplaces, including the development and implementation of policy.

It includes:

Communicating with relevant stakeholders

Developing and monitoring sustainability policies

Reviewing and improving sustainability policies.

Competency field

Competitive manufacturing tools

Licensing/Regulatory Information

Pre-Requisites

Employability Skills Information

Elements and Performance Criteria Pre-Content

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Develop workplace	1.1 Define scope of sustainability policy.

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	sustainability policy.	1.2 Identify and consult stakeholders as a key component of the policy development process.
		1.3 Include strategies for minimising resource use, reductions in toxic material and hazardous chemical use and the employment of life cycle management approaches at all stages of work in the policy.
		1.4 Make recommendations for policy options based on likely effectiveness, timeframes and cost.
		1.5 Develop policy is that reflects the organisation's commitment to sustainability as an integral part of the business planning and as a business opportunity.
		1.6 Agree upon appropriate methods of implementation.
2	Communicate the policy.	2.1 Promote the policy, including its expected outcome to key stakeholders.
		2.2 Inform those involved in implementing the policy as to outcomes expected, activities to be undertaken and responsibilities assigned.
3	Implement the policy.	3.1 Develop and communicate procedures to help implement the policy.
		3.2 Implement strategies for continuous improvement in resource efficiency.
		3.3 Establish record systems for tracking continuous improvements in sustainability approaches and assign responsibilities.
4	Review policy implementation	4.1 Record outcomes and provide feedback to key personnel and stakeholders.
		4.2 Investigate success or otherwise of policy.
		4.3 Monitor records to identify trends that may require remedial action, and use to promote continuous improvement of performance.
		4.4 Modify policy and or procedures as required to ensure improvements are made.

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Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competency includes sufficient knowledge to:

know and be able to apply relevant policy development processes and practices

apply an understanding of the principles, practices and available tools and techniques of sustainability management relevant to the particular industry context

know best practice approaches relevant to own work area

be aware of equal employment opportunity, equity and diversity principles and occupational health and safety implications of policy/s being developed

and the skill to

be able to use relevant systems and procedures to aid in the achievement of sustainability in the workplace

be able to apply quality assurance systems relevant to own enterprise

be able to access and apply other relevant enterprise polices, procedures and protocols

have relevant industry competency

Language, **literacy and numeracy requirements**

This unit requires the ability to:

read and evaluate complex and formal documents such as policy and legislation

research, analyse and present information

prepare written reports requiring precision of expression and language and structures suited to the intended audience

adjust communication to suit different audiences

deal with different points of view and dissenting stakeholders.

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A person who demonstrates competence in this unit must be able to provide evidence of the ability to develop and implement integrated sustainability policies and procedures within an enterprise. The review of the policy after implementation will also need to be evidenced.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

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It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

develop relevant policy and procedures that comply with the regulatory requirements

develop a workable implementation strategy

include measurable criteria for reviewing improvement.

Consistent performance should be demonstrated. For example, look to see that:

policy implementation is reviewed

policy is developed to be part of the routine practices of the organisation.

Assessment method and context

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment.

Competence in this unit may be assessed:

by demonstration in the workplace

using targeted questioning for appropriate portions

by use of a suitable simulation and/or a range of case studies/scenarios

by a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency applies to all sectors of the manufacturing industry. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an organisation and across different industry sectors.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Scope of sustainability policy

Scope of sustainability policy include:

An integrated approach to sustainability which includes environmental, economic and social aspects, or a narrower one to focus on each aspect individually

The parts of the enterprise to which it is to apply , including whether it is for the whole enterprise, one site, one work area or combinations of these

An investigation of the particular business and market context of the industry/ enterprise

Addressing sustainability initiatives through reference to standards, guidelines and approaches such as:

ISO 14001 Environmental Management Systems

Life Cycle Analyses

Global Reporting Initiative

Ecological Footprint Assessment

Triple Bottom Line reporting

Product Stewardship.

Stakeholders

Stakeholders include Individuals and groups both inside and outside the organisation that have some direct interest in the enterprise's conduct, actions, products and services, including:

employees at all levels of the organisation

customers

suppliers

regulators

other organisations.

Strategies

Strategies include:

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awareness raising among stakeholders
training of staff in principles and techniques of sustainability
promotional activities.

Unit Sector(s)

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LGAPLEM506A Improve community knowledge and skills in environmental management practices

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor This unit covers identifying, implementing and reviewing methods for improving community knowledge and skills in environmental management practices.

Application of the Unit

Application of the Unit This unit supports the attainment of skills and knowledge required for competent workplace performance in councils of all sizes. Knowledge of the legislation and regulations within which councils must operate is essential. The unique nature of councils, as a tier of government directed by elected members and reflecting the needs of local communities, must be appropriately reflected.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite Unit/s

Employability Skills Information

Employability Skills This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Identify the demographic composition of the community, and of interest groups and organisations in the community**	1.1. Demographic data on community is gathered and collated. 1.2. Community interest groups and organisations are identified. 1.3. Data is analysed to identify the composition and characteristics of the local community.
2. **Identify community need for information, skills and opportunities for involvement in environmental management practices**	2.1. Relevant information to assist community knowledge , skills and opportunities for community involvement in environmental management is identified, researched and collated. 2.2. Links with community interest groups, organisations and the broader community are established to identify information, skills and opportunities. 2.3. Community needs and opportunities for community involvement are established. 2.4. Gaps between expectations and current environmental management practices in the community are identified. 2.5. The need for modification or improvement of existing environmental practices in the community is identified. 2.6. New areas that require the implementation of environmental management practices in the community are identified.
3. **Identify and assess the effectiveness of methods for creating and raising community awareness of environmental management**	3.1. Data on the effectiveness of various methods is gathered and analysed in the context of known community data and environmental management targets. 3.2. Criteria for determining the range and effectiveness of methods are determined, based on known information. 3.3. Criteria are applied to known methods in order to

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ELEMENT	PERFORMANCE CRITERIA
practices	determine relative effectiveness. 3.4. Specialist knowledge and skills are applied to determine the most suitable methods in the community.
4. **Implement appropriate methods to improve community awareness, skills and involvement in community environmental management practices**	4.1. Financial resources are identified within budget cycles to support the achievement of required outcomes. 4.2. Personnel are identified, trained and assigned to tasks so that strategy requirements for skills and knowledge are met. 4.3. Physical facilities and equipment are identified and procured within budget cycles. 4.4. Prioritised methods are implemented appropriately by identified staff. 4.5. Improvement in community awareness of environmental issues is achieved in accordance with local policy, procedures and relevant legislative requirements.
5. **Monitor and review levels of community awareness**	5.1. Regular data is collected and analysed to provide accurate measures of performance. 5.2. Comparisons are made with required outcomes to assess effectiveness. 5.3. Recommendations are made for changes to methods and systems. 5.4. Changes to methods and systems are made to ensure outcomes are achieved. 5.5. Information obtained during monitoring and review is used to develop new methods and systems that are based on accumulated knowledge and experience.

Hidden text

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Required Skills

- collecting and analysing quantitative and qualitative data
- community consultation
- community education
- presenting information to diverse individuals or groups

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REQUIRED SKILLS AND KNOWLEDGE

- programming activities
- program planning, implementation and review
- budgeting
- evaluating.

Required Knowledge

- environmental issues
- community needs and expectations
- council structure, services, policies and procedures
- training requirements and networks
- community development strategies
- native title.

Hidden text

Evidence Guide

EVIDENCE GUIDE

Overview of assessment requirements	A person who demonstrates competency in this unit will be able to perform the outcomes described in the Elements to the required performance level detailed in the Performance Criteria. The knowledge and skill requirements described in the Range Statement must also be demonstrated. For example, knowledge of the legislative framework and safe work practices that underpin the performance of the unit are also required to be demonstrated.
Critical aspects of evidence to be considered	A range of relevant environmental management practices are identified and documented. Community consultation is carried out and documented. Resources are identified within budget cycle. Topics are prioritised relevant to community expectations, identified outcomes and resource constraints. A variety of methods to improve community knowledge, skills and opportunities for involvement is activated. Monitoring and review process is carried out and results are documented.
Context of assessment	On the job or in a simulated work environment.

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EVIDENCE GUIDE

Relationship to other units(prerequisite or co-requisite units)	Prerequisite units: nil. Co-requisite units: nil.
Method of assessment	The following assessment methods are suggested: • observation of the learner performing a range of workplace tasks over sufficient time to demonstrate handling of a range of contingencies • written and/or oral questioning to assess knowledge and understanding • completion of workplace documentation • third-party reports from experienced practitioners • completion of self-paced learning materials including personal reflection and feedback from trainer, coach or supervisor.
Evidence required for demonstration of consistent performance	Evidence will need to be gathered over time across a range of variables.
Resource implications	Access to relevant data sets including: • Australian Bureau of Statistics • community profiles • real or simulated community consultation processes such as workshops • forums • participation in community events.

Range Statement

RANGE STATEMENT

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

Data on community may include:	• Australian Bureau of Statistics data • community profiles • information gathered from community groups and organisations.
Community knowledge	• methods of information distribution • methods for suggesting improvements in systems

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RANGE STATEMENT

may include:	• local authority environmental management policies and practices • other organisation's environmental management policies and practices • community education techniques • networks • environmental management expertise.
Community skills may include:	• composting • mulching • worm farming • waste sorting • community education • action learning • media skills • building materials • energy efficiency (e.g. solar and water) • vegetation • handling and disposing of toxins.
Criteria may include:	• the range of education and marketing methods used • consistency of involvement • level and quality of training provided • level and quality of involvement from each section of the community • funding and resources required to support the involvement • quality and level of benefit derived from involvement • goals for involvement • available resources and funds.

Hidden text

Unit Sector(s)

Unit Sector Planning Units

Hidden text

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Competency field

Competency Field

co-requisite unit/s

Co-requisite Unit/s

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BSBOHS605B Apply occupational hygiene principles to control OHS risk

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to apply occupational hygiene knowledge and the techniques to control occupational health and safety (OHS) risk arising from health hazards at work. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit provides for the application of occupational hygiene knowledge, skills and techniques to identify and assess the real or potential occurrence of chemical, physical or biological agents and other workplace stressors (including their interactions) that may affect the health or wellbeing of workers or others, and the recommendations for controls of such hazards. Other useful skills that support this unit are addressed in BSBOHS406B Use equipment to conduct workplace monitoring. The underpinning knowledge and skills required for this unit are outlined in BSBOHS504B Apply principles of OHS risk management and BSBOHS505C Manage hazards in the work environment, and include knowledge of systematic approaches to managing OHS.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify health hazards that may result from features of the workplace or working environment	1.1. Identify ***workplace factors*** that may affect the health of workers 1.2. Identify health ***hazards*** that may result from work processes, work operations, equipment and work procedures 1.3. Identify possible routes of entry to the body and consequent effects on the body for different workplace factors 1.4. Identify situations where ***OHS specialists and other advisors*** may be required

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ELEMENT	PERFORMANCE CRITERIA
2. Analyse the risks of worker exposure to potentially harmful agents and factors	2.1. Determine ***sources of exposure*** and ***related factors*** to potentially harmful agents and factors in work processes and methods 2.2. Identify equipment, sampling plan and techniques for assessing the exposure to selected agents and factors within a workplace 2.3. Interpret and evaluate monitoring and sampling results to provide an assessment of exposure 2.4. Utilise ***exposure standards*** in the assessment of risks 2.5. Report workplace measurements, interpretations and recommendations to stakeholders in a suitable format for the target group
3. Design risk control strategies and advise on implementation	3.1. Apply the ***hierarchy of control*** to design risk control strategies, noting that ***personal protective equipment*** (PPE) is regarded as the least satisfactory control measure 3.2. Identify inadequacies in existing control measures and provide remedial advice 3.3. Develop, select and implement risk control measures when undertaking effective consultation and collaboration with organisation, affected employees and others 3.4. Access ***external sources of information and data***, and specialist advisors as required, on nature of health hazard, level of risk, and risk control options
4. Monitor and evaluate control strategies to minimise workplace exposures	4.1. Monitor and regularly evaluate quality and outcomes of interventions in consultation with stakeholders and relevant employees 4.2. Facilitate modifications to interventions including consultations, as required, as a result of findings of regular evaluation and monitoring 4.3. Identify and document ***training needs***, and arrange training in consultation with workplace stakeholders if required 4.4. Make recommendations regarding future interventions as a result of evaluation and monitoring

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Required Skills and Knowledge

Required skills

- analytical skills to:
  - identify areas for improvement with OHS incidents
  - analyse relevant workplace information and data, and to make observations of workplace tasks and interactions between people, their activities, equipment, environment and systems
  - contribute to the assessment of resources needed to systematically manage OHS and, where appropriate, access resources
  - contribute to the strategic OHS performance of the organisation
- attention to detail when making observations and recording outcomes
- numeracy skills to:
  - carry out simple arithmetical calculations (e.g. % change) and to produce graphs of workplace information and data, to identify trends and recognise limitations of information and data
  - interpret results from workplace measurements
  - use electronic information and data systems to enter workplace information and data, and to produce effective graphical representations
  - use measuring equipment including reading scales and dials applicable to selected hazards
- research skills to access relevant OHS information and data to interpret information and data, to identify areas for improvement
- communication skills to:
  - conduct effective formal and informal meetings and to communicate effectively with personnel at all levels of the organisation, OHS specialists and, as required, emergency services personnel
  - write policies, procedures and plans
  - use language and literacy skills appropriate to the workgroup and the task
- consultation and negotiation skills to develop plans, and to implement and monitor designated actions
- project management skills to achieve continuous improvement and change
- organisational skills to manage own tasks within a timeframe
- information technology skills to access and enter internal and external information and data on OHS and to use a range of media

Required knowledge

- characteristics of sound and vibration, units of noise, sound pressure levels, noise dose and process of hearing loss
- characteristics, mode of action and units of measurement of major hazard types
- difference between hazard and risk
- difference between ionising and non-ionising radiation, and the principles of decay and the effect of radiation on the body

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Required skills

- different categories of chemicals such as dangerous goods, hazardous substances, poisons, carcinogens
- direct and indirect influences that impact on OHS and the environment in the design of product/s
- effect of electricity on the body and the difference in action of fuses/circuit breakers and resident current devices
- ethics related to professional practice
- exposure standards, their limitations and their practical use
- formal and informal communication and consultation processes, and key personnel related to communication
- hierarchy of control and considerations for choosing between different control measures, such as possible inadequacies of particular control measures
- how the characteristics and composition of the workforce impact on risk and the systematic approach to managing OHS, for example:
  - labour market changes
  - structure and organisation of workforce e.g. part-time, casual and contract workers, shift rosters, geographical location
  - language, literacy and numeracy
  - communication skills
  - cultural background/workplace diversity
  - gender
  - workers with specific needs
- internal and external sources of OHS information and data
- key personnel, including identifying 'change agents', within workplace management structure
- language, literacy and cultural profile of the work group
- legislative requirements for OHS information and data, and consultation
- limitations of generic hazard and risk checklists, and risk ranking processes
- mathematical knowledge of units of measurement, logarithmic scales, decimals and order of magnitude relevant to making and interpreting measurements
- nature of workplace processes (including work flow, planning and control) and hazards relevant to the particular workplace
- organisational behaviour and culture as it impacts on OHS and on change
- organisational culture as it impacts on the workgroup
- organisational OHS policies and procedures
- other functional areas that impact on the management of OHS
- pertinent sections of relevant Australian and other standards such as AS/NZS 4360: 2004 Risk management, National Standard for the Storage and Handling Workplace Dangerous Goods [NOHSC: 1015(2001)] and National Standard for Manual Handling [NOHSC: 1001 (1990)]
- physiology related to temperature control of the human body, hazards of working

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Required skills
in hot environments and appropriate controls • physiology relevant to understanding mode of action of physical, biological and chemical agents on the body and how they produce harm • principles and practices of a systematic approach to managing OHS • principles of duty of care including concepts of causation, foreseeability, preventability • requirements for control of work permits/written authorities in workplace monitoring activities • requirements for individual fitting, use, maintenance and storage of a range of PPE items • requirements for selection and limitations of use of a range of PPE items • requirements under hazard-specific OHS legislation and codes of practice • risk as a measure of uncertainty and the factors that affect risk • role of control programs for microbiological hazards such as vaccination, local ventilation, decontamination • roles and responsibilities under OHS legislation of employees including supervisors, contractors, OHS inspectors • roles and responsibilities in relation to communication and consultation for OHS committees, OHS representatives, line management, employees and inspectors • sampling methodologies, application and related statistical measures • sources of occupational disease and their prevention • standard industry controls for a range of hazards • toxicology of hazardous materials and potential health effects in the workplace • types of hazard identification tools including job system analysis (JSA) • types of hazardous dusts and fibres, hazardous environments, and the possible ill health outcomes from exposure to dusts, particles • types of measurement and monitoring equipment, including intrinsically safe equipment, calibration requirements and principles of how the equipment takes the measurement and limitations in use

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and	Evidence of the following is essential:

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EVIDENCE GUIDE	
evidence required to demonstrate competency in this unit	• application of hygiene interventions to control OHS risk in work design processes and the work environment • products developed for application of knowledge and skill in hygiene interventions • how these products were developed • use of these products • knowledge of toxicology of hazardous materials and potential health effects in the workplace.
Context of and specific resources for assessment	Assessment must ensure: • access to relevant legislation, standards and guidelines • access to workplace for identification and measurement activities.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • direct questioning combined with review of portfolios of evidence and third party reports of on-the-job performance by the candidate • demonstration of techniques used to apply occupational hygiene principles to control OHS risk • observation of performance in role plays • observation of presentations • oral or written questioning to assess knowledge of principles to control OHS risk • review of authenticated documents from the workplace or training environment • evaluation of monitoring and sampling results • assessment of reporting of workplace measurements, interpretations and recommendations to stakeholders • review of documented training needs and training arranged as a result of these needs • evaluation of reports on occupational hygiene programs.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • BSBOHS406C Use equipment to conduct

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EVIDENCE GUIDE	
	workplace monitoring • BSBOHS504B Apply principles of OHS risk management • BSBOHS505C Manage hazards in the work environment.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Workplace factors may include:	• chemical agents such as:
	  • solids
	  • liquids
	  • gases
	  • hazardous or non hazardous substances
	  • toxins
	  • vapours
	  • dusts
	  • mists
	  • fibres
	  • chemical hazards occurring through airborne exposure and through skin contact
	  • other chemical contaminants arising through direct use or as by-product contaminants
	• physical agents such as:
	  • noise
	  • vibration
	  • pressure
	  • light
	  • thermal
	  • ionising and non-ionising radiation
	• biological agents such as:

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RANGE STATEMENT	

	• viruses
	• bacteria
	• zoonoses
	• animals
	• animal products
	• plants and plant products
	• allergens that may induce asthma, dermatitis
	• ergonomic factors such as:
	  • body position in relation to use of equipment or controls/awkward postures
	  • harmful repetitive work
	• psychosocial factors such as:
	  • exposure to harmful/psychological stress at work due to work demand, environment.

Hazards may include:	• source or situation with a potential for harm in terms of human injury or ill health, damage to property or the environment, or a combination of these.
OHS specialists and other advisors may include:	• allied health • engineers (ventilation, mechanical, chemical, electrical) • equipment manufacturers and suppliers • ergonomists • injury management and return to work advisors • internal and external OHS professionals • occupational health advisors • specialist occupational hygienists • substance manufacturers, importers and suppliers • toxicologists.
Sources of exposure may include:	• needle stick exposures • noise etc. produced by plant and machinery • occupationally related contact • substances/products created or generated by work processes, for example fume, carbon monoxide and dust • working with animals and animal products.
Related factors may include:	• dose related impacts • synergistic/potentiation effects (increased

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RANGE STATEMENT	
	effects of multiple exposures) compared with antagonistic effects (lessening effects of two or more substances than the effect of each in isolation).
Exposure standards may include:	• established concentrations of substances that are given as guidance in assessing the risk of exposure • state/territory, national and/or international publications.

Hierarchy of control may include:	• eliminating hazards
	• and where this is not practicable, minimising risk by:
	  • substitution
	  • isolating the hazard from personnel
	  • using engineering controls
	  • using administrative controls (e.g. procedures, training)
	  • using PPE.

Personal protective equipment may include:	• equipment designed to be worn by a person to provide protection from hazards, such as:
	  • clothing and footwear
	  • face and eye protection
	  • hand protection
	  • head protection
	  • hearing protection
	  • respiratory protection.

External sources of information and data may include:	• academic institutions, centres of research and libraries • American Conference of Governmental Industrial Hygienists (ACGIH) • Australian Safety and Compensation Council • Australian Standards, national codes of practice, guidance notes • Commonwealth Scientific and Industrial Research Organisation (CSIRO) • databases such as National Industrial Chemicals Notification and Assessment Scheme (NICNAS) • engineers • external OHS professionals and specialists • manufacturers' manuals and specifications

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RANGE STATEMENT	
	• material safety data sheets (MSDSs) • National Health and Medical Research Council (NHMRC) • OHS professional associations • state and territory OHS regulatory bodies • union and employer associations • Workplace Exposure Standards (WES).
Training needs may include:	• correct selection, use, servicing, storage and disposal of PPE • interpretation of information and data contained in MSDSs, technical documents or brochures about substances, tools, equipment and plant • legislative requirements • maintenance of equipment, tools and plant to ensure effective performance of control systems • methods of minimising exposure • personal hygiene • requirements for health monitoring of use of certain workplace hazardous substances such as lead • risks associated with specific tasks • workplace housekeeping.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Regulation, Licensing and Risk - Occupational Health and Safety

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Co-requisite units

Co-requisite units		

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MSS017007A Design for sustainability

Modification History

Not applicable.

Unit Descriptor

This unit of competency covers the designing of a new product, or the redesigning of an existing product as a sustainable product or to improve its sustainability. It may be applied to a physical product, a service or some other type of ‘product’.

Application of the Unit

This unit is a Vocational Graduate Certificate unit and follows the AQF guidelines for such units in that it assumes an entry qualification, such as:

- an Advanced Diploma or Diploma in sustainability or relevant technical field,
- a Bachelor Degree in a relevant technical field
- other relevant higher education qualifications, often with relevant vocational practice
- relevant extensive vocational practice, without formal qualifications but which result in appropriate entry level skills.

This unit covers the analysis of the benefit received by the consumer and then an examination of how best this benefit can be delivered to maximise both the benefit and the sustainability of this benefit. It includes an analysis of the cradle to grave/cradle to cradle impacts of the product and the various sustainability impacts along the value chain.

This unit will lead to the design specification for a sustainable/more sustainable product. It does not include the implementation of that design.

It would typically be undertaken by a manager or senior technologist who has a significant sustainability responsibility work role.

Skills covered by this unit may be applied individually or in a team context.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

1	Define the benefit received by the customer	1.1	Select an existing or potential new product for analysis
		1.2	Determine who the customers are for the product
		1.3	Determine uses of product by customers
		1.4	Analyse the benefits received by the customer from using the product
		1.5	Define and rank the benefits received
		1.6	Validate benefits in an appropriate manner
2	Develop alternative ways of delivering benefit	2.1	Brainstorm alternative methods of delivering required benefits
		2.2	Brainstorm related benefits which may also be able to be delivered
		2.3	Analyse sustainability impacts of each alternative
		2.4	Consult with relevant stakeholders, as appropriate
		2.5	Rank alternatives by sustainability
		2.6	Prepare an initial business case for top ranked alternatives
3	Develop product and process design	3.1	Develop product design specification for alternatives most likely to be implemented
		3.2	Determine likely production process for alternatives most likely to be implemented

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		3.3	Analyse life cycle sustainability for alternatives most likely to be implemented
		3.4	Select alternative to develop
		3.5	Consult with relevant stakeholders, as appropriate
		3.6	Confirm selected alternative does deliver key customer benefits
4	Confirm design for selected alternative	4.1	Develop and document product specification
		4.2	Develop and document key production process parameters
		4.3	Consult with relevant stakeholders, as appropriate
		4.4	Prepare business case for implementing selected alternative
		4.5	Negotiate solutions to value chain issues caused by changed design
5	Communicate required responses as appropriate	5.1	Identify what communications are required and to whom
		5.2	Prepare appropriate reports and recommendations
		5.3	Pitch reports and recommendations, as appropriate
		5.4	Brief appropriate persons as required by determined responses
		5.5	Finalise appropriate recording

Required Skills and Knowledge

Required skills
Required skills include: • using lateral thinking techniques

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• conducting market research • writing and interpreting specifications, operating procedures, manuals, regulations and other complex documents • consulting and negotiating with internal and external stakeholders • conducting life cycle analysis • analysing and problem solving, including root cause analysis • interpreting and manipulating data • drafting reports
Required knowledge
Required knowledge includes: • process and changes which occur at each step in selected value chain • principles of sustainability • sustainability impacts at different points in the value chain • principles of sustainable design • the sustainability hierarchy • sources and transport of materials and components and alternatives • processes for producing products, and alternatives • life cycle analysis techniques • hierarchy of hazard control and its application to sustainability hazards • relevant legislation, regulation and protocols, government incentives and other initiatives • risk analysis and its application to sustainability risks

Evidence Guide

Overview of assessment	A person who demonstrates competency in this unit must be able to determine the sustainability related benefits sought by customers for products and design a product to maximise the identified sustainability related benefits.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • determining customer benefit • identifying and ranking alternative ways of providing

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	that benefit • specifying preferred, sustainable alternative • communicating the above, as appropriate.
Context of and specific resources for assessment	• This unit of competency is to be assessed in the workplace or a simulated workplace environment. • Assessment should emphasise a workplace context and procedures found in the candidate's workplace. • This unit of competency may be assessed with other relevant units addressing sustainability at the enterprise level or other units requiring the exercise of the skills and knowledge covered by this unit. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
Method of assessment	• In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work-like environment.
Guidance information for assessment	

Range Statement

Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment (to manage the impact of the business to ensure the survival of the physical environment) • economic viability (efficiency, cost and waste reduction and competitiveness to support survival of the business) • social sustainability (to manage the impact of the business to ensure its continued survival within the community and the survival of the community)

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Product	Product may include: • physical product • service • some other type of product A product will be something which is produced/developed for/provided to a customer or client
Benefit	Benefit includes, but is not limited to, consideration of the: • deliverable the customer expects • location in which it should occur • timing, duration, frequency and longevity of the deliverable • value to the customer • required maintenance and other 'running' inputs • disposal/replacement required by the customer • the degree to which the designed product is: • portable • modular • reusable • recyclable • returnable • easily able to be repaired after malfunction • durable • aesthetics • price
Alternative methods of delivering benefits	Alternative methods of delivering benefits may include: • selling a redesigned product • selling the benefit obtained from the product rather than the product • selling a combination of physical product and service rather than either • leasing (or similar) of the above • providing buy back/take back or similar • other alternative strategies Alternatives to be considered also include design for: • reuse • remanufacture • recycling
Portion of the value chain	Value chain is the sequence of activities that a firm

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	undertakes to create value/product (good or service). Portion of the value chain includes sections internal or external to the organisation
Sustainability issues of particular relevance	Sustainability issues of particular relevance include: • particular sensitivities of the local ecology, such as: • endangered species • sensitive local flora/fauna • material scarcity • water availability • general ecology issues and regulations, such as: • climate change and carbon footprint • pollution control measures • particular local social issues, such as: • distortions to the housing market • disruption to local lifestyles • general social issues, such as: • corporate citizenship • use or/deterioration to infrastructure • particular local economic issues, such as: • cost of capital • profit margins • competition • general economic issues, such as • state of the economy • stage of the business cycle
Appropriate response	Appropriate response includes: • application of the hierarchy of hazard control to sustainability hazards • when the impact cannot be prevented application of mitigation and amelioration techniques, such as: • capture and storage (e.g. scrubbing) and similar ‘end of pipe’ solutions • dilution/dispersion and similar techniques which reduce concentration but not amount • other approaches which meet the sustainability requirements

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Unit Sector(s)

Sustainability

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Custom Content Section

Not applicable.

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MSACMG802A Audit the use of competitive tools

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers auditing the use of competitive manufacturing tools, modifying a tool or its application and changing the mix of tools used as appropriate. It also covers changing the emphasis and culture away from the use of competitive manufacturing tools as the main focus to taking a whole of enterprise approach with the tools being seen as supporting measures to strategic goals. The unit has a more strategic focus than MSACMG702A Review manufacturing practice tools and techniques.

Application of the Unit

Application of the unit	This unit is intended for managers and people with a similar sphere of influence and scope of authority and responsibility. It is focused on auditing the practice of competitive manufacturing and implementing changes identified through the audit. For a more global unit covering developing the strategic approach adopted by the organisation refer to MSACMG801A Develop the competitive manufacturing approach. The unit includes monitoring workplace practice and the application of selected tools and taking action to ensure progress is continuing towards the desired future state. The unit applies to individuals who are familiar with competitive manufacturing and with a broad range of competitive tools with depth in a moderate range of tools. Where this is not the case the following units which deal more with the selection and introduction of the correct tools for the organisation may be completed:

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	• MSACMS600A Develop a competitive manufacturing system • MSACMS606A Introduce competitive manufacturing to a small or medium enterprise. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Establish systems to monitor progress towards becoming competitive	1.1. Determine agreed indicators of progress towards desired future state 1.2. Capture information showing progress towards desired future state 1.3. Analyse information to determine continued progress towards desired future state 1.4. Ensure there are systems which allow monitoring to proceed routinely
2. Identify areas of manufacturing practice to improve in consultation with work teams and other employees	2.1. Identify work teams and areas which could be making better progress towards desired future state 2.2. Examine competitive tools being used and their contribution towards progress 2.3. Examine other work practices and their contribution towards progress 2.4. Manage the required stakeholder consultations 2.5. Agree on the cause or causes of progress which is not to plan 2.6. Determine appropriate competitive tools use to improve progress 2.7. Develop an implementation plan
3. Facilitate the improvement to manufacturing practice across the enterprise	3.1. Obtain support and necessary approvals from process/system owners 3.2. Arrange for the introduction of new tools or modifications to existing tool practice as required 3.3. Arrange for skills and other infrastructure development as required 3.4. Consult with stakeholders including value chain members about the impact of these changes 3.5. Manage implementation of proposed changes to tools use

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making

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REQUIRED SKILLS AND KNOWLEDGE
• communication at all levels • situation analysis • negotiation
Required knowledge
• competitive manufacturing principles • competitive manufacturing tools, their applications and limitations • customer benefit • ways of determining competency gaps • define, measure, analyse, improve and control (DMAIC) process applied to tool use • desired future state • how to measure progress towards desired future state • root cause analysis

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • critically review continuous improvement processes. In particular look for evidence of: • review of use of competitive tools • introduction of new tools or modification of the use of existing tools • integration of tools with the overall manufacturing strategy and future state.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to

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EVIDENCE GUIDE	
	accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Future state	Future state may include:

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RANGE STATEMENT	
	• process reliability • waste • health, safety and environment (HSE) • maintenance • systems
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment
Organisation	Organisation includes: • any part of a manufacturing or service organisation • companies, government bodies or other body of people aiming to produce a product to service a customer
Desired future state	Desired future state refers to: • the agreed position of where the organisation wants to be
Competitive tools	Those techniques used to improve competitive manufacturing, typically described in the competitive manufacturing 'tools units' including: • 5S • Just in time (JIT)/kanban • quick changeover • root cause analysis • value chain mapping • proactive/preventative maintenance • 6 sigma • standardisation • balance scorecard
Progress not to plan	Progress not to plan includes: • both progress which falls short of plan and which exceeds plan
Improvements	Improvements include: • the use of different or additional tools

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RANGE STATEMENT	
	• the application of the current tools in use in a different way • a change of emphasis from 'tools' to an accepted part of the organisation's culture
Manager	Manager may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of multiple teams in a workplace, departments or entire organisations

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG801A Develop the competitive manufacturing approach

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit takes a strategic view and covers skills aimed at further developing the organisation's competitive manufacturing philosophies and approaches.

Application of the Unit

Application of the unit	This unit applies to organisation leaders and is intended for managers and people with a similar sphere of influence and scope of authority and responsibility. It is a global unit covering the analysis and further development of the overall competitive manufacturing approach adopted by an organization to ensure that the development fits with customer and other value chain member requirements. For a greater focus on reviewing and developing specific competitive manufacturing practices refer to MSACMG802A Audit the use of competitive tools. The unit applies to individuals who are familiar with competitive manufacturing as applied at an organisational level. Where this is not the case the following units can be completed to supply the necessary skills: • MSACMS600A Develop a competitive manufacturing system • MSACMS601A Analyse and map a value chain • MSACMS603A Develop manufacturing related business plans • MSACMC611A Manage people relationships. The following units may also be relevant in some circumstances: • MSACMS604A Manage competitive manufacturing processes in a jobbing shop environment • MSACMS606A Introduce competitive manufacturing

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	to a small or medium enterprise. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Analyse organisation's current competitive	1.1. Identify the organisation's competitive advantages and weaknesses 1.2. Identify current health, safety and environment

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ELEMENT	PERFORMANCE CRITERIA
manufacturing approach	(HSE) profile 1.3. Determine current competitive manufacturing/proactive maintenance strategy and analyse for consistency of application across organisation 1.4. Compare the strategy to current competitive needs 1.5. Determine potential changes which might impact on competitive manufacturing strategy 1.6. Identify areas where improvement is necessary 1.7. Discuss potential improvement areas with relevant managers
2. Analyse fit with value chain	2.1. Review value chain map against current competitive and strategic position 2.2. Determine the impact of changes which have occurred 2.3. Identify areas where improvement is necessary
3. Review and modify the competitive manufacturing approach	3.1. Determine required strategy changes 3.2. Negotiate changes with relevant stakeholders 3.3. Develop an agreed revised strategy 3.4. Develop an agreed implementation plan 3.5. Obtain support from process/system owners 3.6. Manage the development of cascading tactical implementation plans
4. Implement modified strategy	4.1. Obtain necessary permissions and authorities 4.2. Monitor the implementation of the modified strategy and tactical plans 4.3. Take required actions to achieve planned outcomes 4.4. Check that planned improvements have occurred 4.5. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making

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REQUIRED SKILLS AND KNOWLEDGE
• communication at all levels • situation analysis
Required knowledge
• competitive manufacturing principles • competitive manufacturing tools, their applications and limitations • workplace strategy and vision • ways of determining competency gaps

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • critically review and improve competitive manufacturing strategy. In particular look for evidence of: • ongoing review of strategy • analysis of current situation both for organisation and value chain • implementation of improvement plans.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified

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EVIDENCE GUIDE	
	for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their

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RANGE STATEMENT	
	impact on health, safety and environment
Organisation	Organisation includes: • any part of a manufacturing or service organisation • companies, government bodies or other body of people aiming to produce a product to service a customer
Competitive philosophy	Competitive philosophy includes that body of knowledge and techniques which together guides an organisation towards achieving best practice in their processes and includes: • manufacturing practice • lean manufacturing • agile manufacturing
Prioritising action	Prioritising of actions may include: • cost/benefit analysis • readiness analysis • tactical survival response
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices
Manager	Manager may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of multiple teams in a workplace, departments or entire organisations

Unit Sector(s)

Unit sector	CM Graduate

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG800A Analyse data for relevance to organisational learning

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the analysis of data generated from formal information monitoring and management systems such as SPC and six sigma or Systems Control and Data Acquisition (SCADA) software and determining its relevance for organisational learning.

Application of the Unit

Application of the unit	This unit is intended for managers, team leaders and people with a similar sphere of influence and scope of authority and responsibility. It covers the capturing of knowledge from data generated within organisation systems and takes a largely quantitative view of information. The unit applies to individuals who are familiar with the application and use of statistics in manufacturing. Where this is not the case the unit MCMT452A Apply statistics to processes in manufacturing may be completed to supply the necessary skills. For a more qualitative approach of capturing and analysing data and applying the knowledge deduced from that to organisational learning see MSACMG708A Capture learning from daily activities in a manufacturing organisation. This unit may also be applied to service organisations applying competitive manufacturing principles.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify learning from own organisation data.	1.1 Obtain data from appropriate data systems 1.2 Examine data for discontinuities, trends and other possible signs of assignable cause 1.3 Examine selected data events to determine root causes of data events 1.4 Communicate root causes of data event(s) to relevant stakeholders
2. Identify learning from value chain data.	2.1 Identify data which is or could be available from other value chain members 2.2 Identify data which might be useful but is not available and seek access to it

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ELEMENT	PERFORMANCE CRITERIA
	2.3 Obtain and examine available data for discontinuities, trends and other possible signs of assignable cause 2.4 Examine selected data events to determine root causes of data events in liaison with appropriate value chain personnel 2.5 Communicate root causes of data events to relevant stakeholders
3. Capture learning	3.1 Review root causes to determine implications for organisational learning 3.2 Ensure learning is captured by organisation's systems 3.3 Obtain involvement and required approvals from relevant process/system owners 3.4 Check that learning flows to all relevant stakeholders
4. Apply learning to team/organisation.	4.1 Review management systems for their impact on organisational learning 4.2 Brief relevant process/system owners on changes and obtain required approvals 4.3 Check learning is used in daily operations 4.4 Review use of learning in liaison with appropriate value chain personnel and update in knowledge system 4.5 Identify implications for training and procedures 4.6 Recommend improvements to value chain/organisation knowledge system.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
The required skills for the unit include: • problem solving • root cause analysis • communication at all levels • use of organisation knowledge system • data manipulation
Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
The required knowledge for the unit include: • competitive manufacturing principles • organisational goals and processes • continuous improvement • communication methods • root cause analysis • maths and statistics • expected range of performance for process • types of knowledge capture and retrieval systems and their applicability

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should demonstrate competence in an operating/processing/work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will encompass a range of situations which may be typical or atypical. Evidence may be acquired from activities actually undertaken in the workplace or from workplace based projects which have been designed to provide the required evidence and also provide some benefit to the employing organisation. This unit of competency includes a body of knowledge which will be assessed through questioning and/or other techniques which provide evidence of the required knowledge.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to recognise, extract and record learning from workplace generated data. In particular look for evidence of: • translation of data into useful information • ongoing additions to the learning system • use of the learning system

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EVIDENCE GUIDE	
Context of and specific resources for assessment	Assessment will require access to a workplace over an extended period of time, or a suitable method of gathering evidence of competency over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	It may be appropriate to assess this unit concurrently with other relevant units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Data systems	Data systems to include HSE and maintenance systems along with process and quality systems
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Health, safety and environment (HSE)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment.
Data	Data may come from any or all of a range of internal and value chain sources including: • Statistical Process Control (SPC) processes • 6 sigma processes • Quality processes

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RANGE STATEMENT	
	• plant instrumentation and control data
Causes of data events	Data events need to be analysed to separate causes of changes in data from those which may coincidentally be chronologically correlated.
Performance not to expectation/norm	Performance outside the normal range (good or bad) may be expected to have an assignable cause which when identified can add to knowledge.
Other value stream members	Other value stream members includes internal and external suppliers and customers
Learning	Learning is something which can be passed on and is a recordable event or method etc. which leads to change in practice
Systems for the capture of knowledge	Systems for the capture of knowledge may be paper based electronic or other and may include: • clip boards on the line • problem solving templates • procedures templates • white boards/other notice boards • data bases and other electronic records • incident reports • maintenance requests They may have as part of them a method of knowledge retrieval and possibly of searching, filing and cataloguing
Record	Appropriate records include systems which ensure knowledge: • is not just retained by an individual • is available to others • survives beyond the departure of individual • has an allocated a level of importance.
Stakeholders	Stakeholders include work team members, value chain members as well as other stakeholders.

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Unit Sector(s)

Unit sector	Vocational Graduate Certificate in Competitive Manufacturing Vocational Graduate Diploma of Competitive Manufacturing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG712A Lead a problem solving process to determine and solve root cause

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers guiding or leading a problem solving process to solve complex and/or unusual problems. The problem solving process will usually involve the use of either real or nominal groups to determine the root cause and propose the solution.

Application of the Unit

Application of the unit	This unit will typically be undertaken by managers and/or technical experts. In a typical scenario, a manager or technical expert will be confronted by a complex problem to which they need to develop a solution. The problem may be related to any area or process within the enterprise or in the value chain. The person may or may not have the required technical expertise for the particular problem, although the problem will require technical expertise to be solved. The problem may be capable of being adequately defined at the beginning of the problem solving activity, or may be progressively defined through continued iterations of the problem solving activity.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Recognise complex problem	1.1. Identify a complex issue which needs to be addressed 1.2. Undertake an initial investigation of the issue 1.3. Determine initial areas of expertise and data which may be required to analyse the problem 1.4. Develop an initial definition of the problem
2. Develop problem solving methodology	2.1. Draft a problem solving methodology 2.2. Develop required approaches and protocols for obtaining required data and information 2.3. Establish group to assist with problem solving 2.4. Allocate tasks, responsibilities and reporting arrangements to group 2.5. Develop arrangements for consultation with required people outside of group

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ELEMENT	PERFORMANCE CRITERIA
3. Analyse problem	3.1. Apply methodology 3.2. Obtain data/information 3.3. Review problem definition 3.4. Review methodology 3.5. Obtain additional data/information as required
4. Identify root cause	4.1. Map causal links for the problem 4.2. Determine indicators of the problem or the problem precursors 4.3. Identify causes which can be controlled/brought under control
5. Develop a solution	5.1. Develop solutions for controllable causes 5.2. Determine benefit/cost for proposed solutions 5.3. Investigate proposed solutions for efficacy 5.4. Select the best available solution 5.5. Obtain necessary support and authorisations for proposed solution 5.6. Initiate the implementation of the solution
6. Check problem is solved and standardised	6.1. Monitor indicators of problem/problem precursor 6.2. Review problem solution/implementation as required 6.3. Ensure appropriate solution is standardised

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• ability to cooperate and work with others, both internally and externally to the work group • analysis and planning • data interpretation and application skills • communication skills (both receiving and sending communications) • problem solving and prioritising
Required knowledge
• understanding of thetechniques and methodologies of problem solving

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REQUIRED SKILLS AND KNOWLEDGE
• data required for problem solving • alternative/proxy data sources • benefit/cost analysis • root cause analysis • problem solving tools and techniques

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • undertake complex problem identification • establish appropriate methodologies, including establishing team responsibilities, to achieve root cause identification • propose and implement solutions that can be standardised.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of

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EVIDENCE GUIDE	
	workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Complex problem	A complex problem may be described as one which has several of the following characteristics:
	• requires going into the value chain for data/information
	• is wider than just applying to a single job
	• applies to less common solutions or problems
	• requires a higher level of knowledge and skill (which may or may not be possessed directly by the person solving the problem) such as:
	  • significant specialist knowledge
	  • significant specialist skill

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RANGE STATEMENT	

	• more theory/understanding of technology or process
	• data is not easily available and may need particular strategies to obtain such as:
	  • overcoming resistance from people including employees, customers or suppliers
	  • extracting data not regularly reported from systems control and data acquisition (SCADA) or similar systems
	  • the problem and/or proposed solutions require reporting or authorisations from a Board or external authorities such as licensing or regulatory bodies

Problem recognition	The problem recognition may include: • an obvious and current complex problem • an intractable problem which has been known about and 'lived with' for some time • a complex problem which has not been previously recognised The problem may, or may not be capable of complete definition at the start of the problem solving process (so requiring an iterative process)
Problem solving methodology	Problem solving methodology may include: • cross functional problem solving team • cross functional nominal group (virtual team) • members from outside the organisation on some basis • input from other members of the value chain • the use of known/proprietary problem solving approaches or some synthesis of methods • commissioned research either in whole or in part
Group	Problem will be such that it is beyond the scope of an individual to solve and so a group is required. The group may be: • real (i.e. physical, face-to-face) • nominal (i.e. never meets and may not know who each other is) • or any combination in between

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RANGE STATEMENT	
Solution efficacy	Checking solution efficacy includes: • ensuring the solution breaks the causal tree • checking that other causes are not able to cause the problem • benefit/cost ratio • ease of implementation • permanence of solution
Solution standardisation	Standardisation of a solution solves the problem and should include all relevant standards within the organisation including: • standard operating procedures/work instructions • actual work practice • maintenance manuals and similar • product and/or process specifications

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG711A Manage benchmarking studies

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the undertaking of benchmarking studies either directly or as a leader in a team undertaking benchmarking. It covers both performance and process benchmarking. It does not cover product or strategic benchmarking.

Application of the Unit

Application of the unit	In a typical scenario, an organisation undertakes benchmarking as an input to an improvement process. The benchmarking may be used to find areas for improvement or to provide information as to how to make the improvements. The benchmarking process would: • decide the nature of the benchmarking to be undertaken • collect the benchmarking data and information • determine what actions to be taken based on the benchmarking • take the required steps to have those actions implemented • identify the ongoing nature of these benchmarking activities. Generally benchmarking will be undertaken by a team although it may be largely the responsibility of an individual. This unit applies either to that individual or to a leader in the team. The benchmarking activity may use benchmarks which are derived either internally to the organisation or externally from the organisation although some degree of externality would be expected in most application environments.

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	This unit does not require the statistical or financial analysis of data, but does require the interpretation and application of information derived from such analyses.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify nature of benchmarking activity	1.1. Identify area to be benchmarked 1.2. Determine the core set of benchmark measures required

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ELEMENT	PERFORMANCE CRITERIA
2. Develop the benchmarking methodology	2.1. Determine baseline in area of study for core measures 2.2. Confirm nature and source of data/information to be collected 2.3. Agree on likely suitable sources of benchmarking data/ information 2.4. Confirm required survey methodology
3. Conduct benchmarking survey	3.1. Establish required communication channels for survey 3.2. Obtain required data/information 3.3. Validate data/information as required by methodology
4. Apply results of benchmarking	4.1. Interpret the analysed results of the survey 4.2. Agree required improvement actions resulting from the survey 4.3. Analyse health, safety and environment (HSE) implications from proposed actions 4.4. Modify proposed actions as required to ensure they are at least HSE neutral 4.5. Initiate the implementation of the improvement actions 4.6. Follow through on improvement actions to ensure they are fully implemented
5. Improve the benchmarking process	5.1. Analyse the benchmarking process just undertaken 5.2. Analyse the changes which have resulted from the benchmarking 5.3. Identify areas for improvement 5.4. Agree ways of improving future benchmarking activities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• ability to cooperate a and work with others, both internally and externally to the

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REQUIRED SKILLS AND KNOWLEDGE
work group • analysis and planning • communication skills (both receiving and sending communications) • problem solving and prioritising
Required knowledge
• understanding of the organisation's performance data and/or processes subject to the benchmarking to a level needed to identify appropriate applications for benchmarking and apply the benchmarking results to it • benchmarking protocols • benchmarking code of practice • legal and ethical issues involved in benchmarking • different approaches to benchmarking and their applications • performance versus process benchmarking • criterion referenced versus qualitative versus quantitative benchmarking and the applications of each • group processes • own organisation's intellectual property and stance on confidentiality • benchmarking partners' attitudes to confidentiality • application of benchmarking to continuous improvement and the concept of continually improving best practice • distinction between measurable data and useful information • validity of benchmarking measures, data and information • measures of data quality and methods of improving the quality of benchmarking information • application of benchmarking data and information to balanced score card approaches

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • undertake benchmarking • implement (or initiate and follow through on the

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EVIDENCE GUIDE	
	implementation of) the actions which flow from the benchmarking • examine the outcomes and identify improvements.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Determine area to be benchmarked	The area of the organisation, plant or process to be benchmarked may be determined by: • previous benchmarking or other area of need • informal conversations with customers, employees or suppliers; • exploratory research techniques such as focus groups • in-depth marketing research, quantitative research, surveys, questionnaires, engineering analysis, process mapping, quality control variance reports, or financial ratio analysis
Sources of benchmarking data	Sources of benchmarking data may include: • other relevant areas within the same organisation • external organisations in a similar market/with similar processes • external organisations recognised as a leader in the process/activity under study • benchmarking consultancies offering access to relevant data/information/organisations

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSACMG710A Improve visual management in the workplace

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the assessment of current visual management strategies and techniques in the workplace and improving the application of visual management strategies and techniques and their integration into the overall competitive improvement approach of the enterprise.

Application of the Unit

Application of the unit	This unit applies to improving an organisation's visual management in the workplace. The level of existing visual management is not required to be extensive for the unit to apply. This unit covers examining the workplace to determine the effectiveness of current visual management strategies and tools, the determination of additional/alternative visual management strategies and tools and their integration into overall improvement strategies within the enterprise. The visual management may be applied to the whole enterprise or a production area or a support area and can either be active visual management strategies such as operator controlled status indicators or passive such as information boards or information islands containing production and other data to give employees access to production, occupational health and safety (OHS), equipment availability or other data.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Determine current visual management activities and information needs	1.1. Identify current visual management activities and provided information 1.2. Establish extent of linkage of visual management activities and provided information to other competitive manufacturing strategies and techniques 1.3. Identify problems and improvements which could be made 1.4. Determine root cause of problems 1.5. Determine visual management techniques and information needs for improvement to occur 1.6. Determine benefit which would accrue from improvement and cost of providing the information
2. Choose which things	2.1. List all valuable information identified

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ELEMENT	PERFORMANCE CRITERIA
to display visually	2.2. Rank possible information based on benefit/cost or other agreed basis 2.3. Agree on the critical information and possible information sources which should be included in the visual management system 2.4. Negotiate the provision of this critical information to an adequate precision and in a timely manner
3. Choose display method	3.1. Choose the most appropriate display method for each item of critical information 3.2. Determine the most appropriate location for the visual display of each item of critical information 3.3. Determine the appropriate source and approving authority for display information 3.4. Review the chosen information, information source, display method and location to ensure the right display of the right information 3.5. Validate data/information as required by methodology
4. Review the results of visual management	4.1. Review actual benefit gained and the actual cost of providing the information 4.2. Validate the appropriateness of the information provided for delivering the intended outcome 4.3. Initiate appropriate improvements to the visual management system 4.4. Follow through on improvement actions to ensure they are fully implemented

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• ability to cooperate and work with others, both internally and externally to the work group • analysis and planning • communication skills (both receiving and sending communications) • problem solving and prioritising

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge

• understanding of the organisation's processes subject to the visual management to a level needed to apply visual management to it
• operator visual management techniques including:
  • comparators, status and indicators
  • colour standards and standard signalling
  • tools
  • andon lights (visual alarm of a problem - manual or automatic actuation, may also include audible alarm)
  • the use of tags, labels and similar
• visual management strategies to provide information to employees including:
  • to provide status at a glance - normal versus abnormal conditions/quality
  • to reinforce standard work
  • to predict quality/productivity problems
  • to provide instructions, directions, reminders
  • to inform, alert and motivate workers
  • as a safety and environmental tool
• the application of visual management as part of:
  • 5S, 5S audits
  • quick changeover
  • proactive maintenance
  • kanban
  • flow
  • waste walks
  • kaizen events

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate	Demonstrates skills and knowledge required to: • undertake visual management improvement

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EVIDENCE GUIDE	
competency in this unit	• implement (or initiate and follow through on the implementation of) the actions which flow from the visual management project • examine the outcomes and identify improvements.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Purposes of visual control	The purposes of visual management include: • making the problems, abnormalities or deviations from standard visible to everyone and thus corrective action can be taken immediately • displaying the operating or progress status in a easy to see format • providing instruction • conveying information • providing immediate feedback to people • create structure • develop agreement on standards and indicators • improving health, safety and environment (HSE) performance
Determine information required	Determining information which may be required can include: • discussions with users • discussion with generators of information (e.g. sales, marketing, production planning or maintenance departments to determine available information) • comparing current state with future state • identifying information causes of current problems
Method for displaying information	Method for displaying information may include: • colour coding • pictures/graphics • kanban cards • coloured lines • signage • labelling • control boards

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RANGE STATEMENT	
	• area information boards • gauges and dials • checklists • Gantt charts
Where to display	Information may be displayed: • at the machine or cell/on the plant or equipment (e.g. performance feedback, process conditions) • at a workstation (e.g. work instructions) • on a control panel • centrally (e.g. general plant or team information) • visible to all (e.g. andon lights, HSE alarms)

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG709A Facilitate improvements in the external value chain

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills in working with value chain members to improve the overall effectiveness of the value chain, so delivering greater value to the customer. It includes other organisations within the value chain/supply chain.

Application of the Unit

Application of the unit	This unit applies to managers and team leaders with appropriate authority and people with a similar sphere of influence and scope of authority and responsibility for working with value chain members outside their own organisation referred to as 'source-to-destination' value chains. For skills associated with a 'gate-to-gate' (internal) value chains refer to MSACMG704A Facilitate improvements in the internal value chain. The unit includes the use of skills to resolve issues from one or more value stream member which impact on the overall ability of the value stream to continue to improve and offer better value to the customers. The improvement practices may (or may not) have used previously within their own organization, other teams and organisations within the value chain. The unit does not cover mapping or managing value chains (refer to MSACMS601A Analyse and map a value chain and MCMS602A Manage a value chain). The unit applies to individuals who are familiar with competitive manufacturing, formal problem solving and

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	root cause analysis, leading change and reducing costs. Where this is not the case the following units can be completed to supply the necessary skills: • MSACMS400A Implement a competitive manufacturing system • MSACMC411A Lead a competitive manufacturing team • MSACMT430A Improve cost factors in work practices • MSACMT280A Undertake root cause analysis. Where previous improvements need to be evaluated refer to MSACMG705A Undertake a qualitative review of a process change and MSACMG703A Analyse process changes. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish scope of value chain activity	1.1. Identify key individuals within value chain organisations 1.2. Jointly identify possible areas of study 1.3. Agree a protocol for undertaking value chain improvement activities 1.4. Confirm confidentiality and other 'no-go' areas
2. Study possible value stream improvements	2.1. Arrange meeting with suitable representatives of the value stream members 2.2. Agree opportunities for improvement and any current or anticipated restrictions 2.3. Work with value stream representatives to determine root cause of restrictions 2.4. Work with value stream member to identify possible solutions to problem 2.5. Define outcomes from any proposed changes
3. Develop a consensus approach to implementing improvements	3.1. Determine benefits/costs to each value stream member from the proposed changes 3.2. Decide whether the proposed improvements will result in a perceived improvement to the end customer 3.3. Determine health, safety and environment (HSE) impacts as a result of the change 3.4. Agree on proposed change/program of changes with all key stakeholders
4. Obtain required approvals	4.1. Draft a formal proposal for the proposed changes 4.2. Submit proposal for all required approvals from stakeholders 4.3. Modify proposal as required in liaison with all key

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ELEMENT	PERFORMANCE CRITERIA
	stakeholders 4.4. Obtain sign off from all process/system owners
5. Measure and communicate gains	5.1. Agree indicators/metrics of success of proposed changes 5.2. Make arrangements to collect necessary data 5.3. Make arrangements for the data to be analysed and presented in an agreed format to the agreed stakeholders 5.4. Agree on the communication plan 5.5. Liaise with stakeholders to implement changes as agreed and approved
6. Review change	6.1. Analyse results of change 6.2. Identify areas where planned improvements have occurred 6.3. Take action to sustain improvement by standardising 6.4. Identify areas which have not met predicted outcome (positive or negative) 6.5. Determine cause of target not being met 6.6. Take appropriate action to improve the value chain

Required Skills and Knowledge

Required skills
• decision making • prioritisation • communication at all levels • negotiation • situation analysis • root cause analysis
Required knowledge
• competitive manufacturing principles • organisational goals and processes • confidentiality and other sensitivities of value chain members • regulatory, anticompetitive issues which may be relevant • continuous improvement and the workplace improvement processes and procedures • value chain members' processes

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Required skills
• value chain mapping and analysis • approval processes within each organisation • benefit/cost analysis methods • methods of determining the impact of a change • communication methods • customer perception of benefits

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • facilitate improvements in the value chain. In particular look for evidence of: • identifying value chain restrictions to further improvement • developing consensus solutions • jointly implementing and monitoring solutions.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package.

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EVIDENCE GUIDE	
	• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Opportunities for continuous improvement	Opportunities for continuous improvement may be beyond those arising just from within the organisation
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, safety and environment (HSE)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their

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RANGE STATEMENT	
	impact on health, safety and environment
Change	Changes may: • be to plant, procedures or practice • be to logistics, communication systems (e.g. ordering, supplying, quality certification) • include kanban/systems control and data acquisition (SCADA) supply/resupply systems across the chain • arise from continuous improvement or an improvement event/project • have been intended to make an improvement or to implement new products, technology or systems • include the implementation of a change Changes do not include an engineering review of a major capital expenditure or similar review
Presentation of information	Information may be: • presented in terms of graphs or other appropriate visual forms
Stakeholders	Stakeholders include: • work team members, value chain members as well as other stakeholders
Results of change	Results of change may include: • an initial improvement followed by a return to previous performance • a change which has resulted in continued improvement • continued detriment or other variations over time
Improvements	Improvements may: • be to process, plant, procedures or practice • include changes to ensure positive benefits are maintained
Changes which have not met target	Changes which have not met target may include: • those that fall short and those that exceed expectations Appropriate action is to remove restrictions on

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RANGE STATEMENT	
	those items which fell short, and make standard/further implement those which exceeded expectation
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG708A Capture learning from daily activities in a manufacturing organisation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the capturing of learning from the shop floor, suppliers and customers in order to contribute to a learning manufacturing organisation.

Application of the Unit

Application of the unit	This unit takes a largely qualitative view of information and knowledge. For a more quantitative approach of capturing and analysing data and applying the knowledge deduced from that refer to MSACMG800A Analyse data for relevance to organisational learning. This unit is intended for team leaders and people with a similar sphere of influence/scope of authority and responsibility. It applies to individuals who already have knowledge of competitive manufacturing, leading teams, analysing root cause and locking in improvements. Where this is not the case the following units may be completed to supply the necessary skills: • MSACMS401A Ensure process improvements are sustained • MSACMC411A Lead a competitive manufacturing team • MSACMC413A Lead team culture improvement • MSACMT280A Undertake root cause analysis. This unit may also be applied to service organisations applying competitive manufacturing principles.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify potential learning opportunities	1.1. Identify formal and informal opportunities for feedback from normal daily activities 1.2. Assess feedback for potential to lead to organisational learning 1.3. Identify opportunities for learning from abnormal events 1.4. Review communications with value chain members for learning opportunities
2. Extract learning from	2.1. Review information gained from potential learning

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ELEMENT	PERFORMANCE CRITERIA
opportunities	opportunities for relevance to performance improvement 2.2. Discuss potential for learning with stakeholders 2.3. Confirm additional knowledge/learning 2.4. Confirm methods for institutionalising learning/standardising
3. Capture and disseminate learning	3.1. Identify methods of capturing and disseminating learning 3.2. Obtain required authorisations from appropriate people 3.3. Record learning according to organisation procedures 3.4. Communicate learning to relevant stakeholders 3.5. Ensure all relevant stakeholders are able to access and apply relevant knowledge/learning
4. Review use of learning	4.1. Check learning is used in daily operations 4.2. Review use of learning and update in organisation knowledge system 4.3. Identify implications for training and procedures 4.4. Recommend improvements to organisation knowledge system 4.5. Confirm methods for institutionalising learning/ standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• problem solving • communication at all levels • use of organisation knowledge system
Required knowledge
• competitive manufacturing principles • organisational goals and processes • continuous improvement

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REQUIRED SKILLS AND KNOWLEDGE
• communication methods • root cause analysis • expected range of performance for process and products • types of knowledge capture and retrieval systems and their applicability

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • recognise, extract and record learning from daily activities. In particular look for evidence of: • ongoing additions to the learning system • use of the learning system.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge.

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EVIDENCE GUIDE	
	• Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment
Opportunities for feedback	Opportunities for feedback include: • tool box meetings • ad hoc discussions/meetings with team members, sales and marketing employees, other employees, value chain members, regulators and visitors

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RANGE STATEMENT	
	• interviews • process/production records • quality records • plant equipment down time/maintenance records
Problem recognition and resolution	Problem recognition and resolution may be expected to include such approaches as: • stopping the line • go and see • team/consensus problem solving • root cause analysis
Learning	Learning is something which can be passed on and is a recordable event or method which leads to change in work practices and/or process or product performance that is able to be standardised/institutionalised
Record	Appropriate records include systems which ensure knowledge: • is not just retained by an individual • is available to others • survives beyond the departure of individual • has an allocated level of importance
Systems for the capture of knowledge	Systems for the capture of knowledge may be paper based, electronic or other and may include: • clip boards on the line • problem solving templates • procedures templates • white boards or other notice boards • computers or terminals that allow access to data bases and other electronic records • maintenance records They may also require knowledge of method of knowledge entry and retrieval and possibly of searching/filing/cataloguing
Reviewing the use of learning	Reviewing the use of learning includes: • analysing the cause and effect of integrating learning into current or future procedures
Performance not to	Performance outside the normal range (good or

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RANGE STATEMENT	
expectation/norm	bad) may be expected to have an assignable cause which when identified can add to knowledge
Extract learning	Extracting learning from opportunities may occur: • using a toolbox meeting or other team process
Stakeholders	Stakeholders include: • work team members, value chain members, supervisors as well as other stakeholders
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG706A Build relationships between teams in a manufacturing environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the development of an attitude of respect for individuals in teams and trust between individuals, teams, supervisors and management in order to develop a suitable culture for implementing and sustaining competitive manufacturing initiatives.

Application of the Unit

Application of the unit	This unit is intended for team leaders and people with a similar sphere of influence/scope of authority and responsibility. It builds on more general competitive manufacturing graduate units and specifically addresses inter-team issues. The unit also encompasses intra-team issues where these are a barrier. The unit envisages a specialist facilitation role in assisting with implementing an enterprise competitive manufacturing culture. It is also about developing a 'whole of value chain' view so that there is not competition between individuals or teams, but rather cooperation to achieve organisation and value stream goals with competition being directed towards other organisations competing in the marketplace. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify organisational relationships	1.1. Map actual and intended process flows within and between teams 1.2. Map actual and intended communication/information/data flows within and between teams 1.3. Identify and map other interactions (actual and intended) within and between teams 1.4. Determine the consequences in terms of customer benefit of intended flows/interactions 1.5. Determine the consequences in terms of customer benefit of the actual flows/interactions
2. Foster cooperation within team	2.1. Present relationships information to team members 2.2. Discuss areas where greater cooperation would yield

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ELEMENT	PERFORMANCE CRITERIA
	benefits 2.3. Agree on ways to achieve greater cooperation in these areas 2.4. Facilitate team implementation of agreed changes
3. Foster cooperation between teams	3.1. Present relationships information to teams/team representatives 3.2. Discuss areas where greater cooperation would yield benefits 3.3. Agree on ways to achieve greater cooperation in these areas 3.4. Obtain any necessary approvals for proposed changes 3.5. Facilitate implementation by teams of agreed changes
4. Identify sources of tension, conflict or competition	4.1. Examine team and individual key performance indicators (KPIs) for sources of conflict/competition 4.2. Examine flows and interactions for possible sources of conflict and competition 4.3. Observe interactions between team members and identify tensions, conflicts and competition 4.4. Observe interactions between teams and identify tensions, conflicts and competition 4.5. Observe response to change and resistance to change
5. Reduce causes of tension, conflict or competition	5.1. Draft modified KPIs to reduce causes of conflict and competition 5.2. Draft modified systems causing conflicting flows and interactions 5.3. Facilitate discussions within and between teams to identify causes of tensions, conflicts and competition 5.4. Facilitate discussions to develop a consensus solution to identified causes of tensions, conflicts and competition 5.5. Obtain any required approvals for suggested/drafted changes 5.6. Facilitate the implementation of the agreed solutions 5.7. Take actions to ensure agreed changes become standard practice

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making • communication at all levels • negotiation • conflict resolution • situation analysis
Required knowledge
• competitive manufacturing principles • organisational goals and processes • types of KPIs, their applications and limits • continuous improvement • communication methods • process mapping, communication and people interaction mapping • customer perception of benefits

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • critically examine relationships within and between teams and to take action to improve them. In particular look for evidence of: • identification of relationships/relationship maps • identification of sources of conflict/tension • consensus development of improvement plans • implementation of those plans and a rechecking of the subsequent relationships.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial in their impact on health, safety and environment

Relationship between organisational teams	Organisational teams may include:
	• downstream customer teams
	• upstream supplier teams
	• support teams (maintenance, IT)
	Relationship between teams includes:
	• the impact of teams on each others' work expressed in competitive manufacturing terms
	Impacts covered could include:
	• supplier, customer and support team impacts on:
	  • flow
	  • pull
	  • takt time
	  • waste

Cooperation within teams	Cooperation within team may include: • assistance with problem solving • dealing with disruptions to flow • dealing with variations of flow level/volume • dealing with variations in quality/quantity/timeliness
Key performance indicators (**KPIs**)	KPIs may include: • reward systems • systems (formal and informal) which encourage some types of behaviour over others

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RANGE STATEMENT	
Resistance to change	Resistance to change may be: • overt or covert
Stakeholders	Stakeholders include: • work team members, value chain members as well as other stakeholders
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG705A Undertake a qualitative review of a process change

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the reviewing of changes made in the manufacturing systems, process or environment to ensure they result in improvement, that gains are maintained and that gains are used as a basis for further gains. The unit includes consensus decision making and methods for capturing information on implemented changes including quantitative and qualitative reports and informal talking to people to make sure gains are maintained and ways are found to build on them. While this unit covers a qualitative review, some basic mathematics may be required although not sophisticated statistical or mathematical analysis.

Application of the Unit

Application of the unit	This unit applies intended for team leaders and people with a similar sphere of influence and scope of authority and responsibility and who have a knowledge of competitive manufacturing, continuous improvement and locking in improvements. Where this is not the case the following units can be completed to supply the necessary skills: • MSACMS400A Implement a competitive manufacturing system • MSACMS401A Ensure process improvements are sustained • MSACMT441A Facilitate continuous improvement in manufacturing • MSACMT451A Mistake proof a production process.

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	This unit covers the skills required for a qualitative approach to the review of a process change. This unit reviews both intended and unintended consequences of change and the effectiveness of the implementation of the change. For a more quantitative review of a process change refer to MSACMG703A Analyse process changes. This unit is not intended to be applied to a technical or engineering review of a major capital expenditure or similar review. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent

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	with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Study a change	1.1. Identify changes which have occurred 1.2. Select a change or group of related changes to analyse 1.3. Determine the initiation of the selected change 1.4. Gather information on the situation within the enterprise and along the value chain prior to the change 1.5. Gather information on the implementation of the change 1.6. Gather information on the intended benefits of the change 1.7. Gather information on the situation within the enterprise and along the value chain after the change 1.8. Note whether results of change have been constant or have changed over time 1.9. Collate and prepare gathered information for distribution
2. Agree results of change with stakeholders	2.1. Present and discuss collected information with relevant stakeholders 2.2. Modify collected information as required based on stakeholder input 2.3. Develop a consensus view of the result of the change which is supported by the information available 2.4. Validate the consensus view with stakeholders
3. Identify future improvements	3.1. Discuss lessons learned from the reviewed change with stakeholders 3.2. Capture key knowledge from the review of the change in accordance with systems and procedures 3.3. Identify future improvements in collaboration with team members 3.4. Validate identified future improvements with stakeholders 3.5. Obtain sign off from process/system owner 3.6. Start the process for implementing future

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ELEMENT	PERFORMANCE CRITERIA
	improvements 3.7. Check that planned improvements have occurred 3.8. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making • communication at all levels • interviewing skills • negotiation • situation analysis
Required knowledge
• competitive manufacturing principles • organisational goals and processes • workplace continuous improvement processes and procedures • methods of determining the impact of a change including basic quantitative analysis of simple process data, but not including advanced statistical/mathematical analysis • methods of information collection and interpretation

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • review process changes.

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EVIDENCE GUIDE	
	In particular look for evidence of: • identification of changes • information gathering and analysis over a period and range that will provide a valid basis for analysis • obtaining a consensus view of the results of the change • determining the lessons to be learned and future improvements to be undertaken.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for	Assessment processes and techniques must be culturally

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EVIDENCE GUIDE	
assessment	appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where changes include areas covered by industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment.
Change	Changes may: • be to plant, procedures or practice • arise from continuous improvement (or an improvement event or project) • may have been intended to make an improvement or to implement new products, technology or systems • include the implementation of a change Changes do not include an engineering or technical review of a major capital expenditure or similar review
Initiation of change	A change may have been deliberately initiated to improve capability, deal with a problem, or a similar intended change. Where a change was not deliberately initiated then the causal factors for the change need to be identified and may include: • a drift in efficiency or quality • a change in materials, feed, components which was being compensated for

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RANGE STATEMENT	
	• a change in personnel which brought different practices
Stakeholders	Stakeholders include: • work team members, value chain members as well as other stakeholders
Gather information	Information may be gathered (e.g. for the situation prior to the change, the implementation process or stage, the intended benefits and the situation after the change) by a number of techniques and it would be expected that several techniques would be used. Techniques may include: • surveys • interviews • walking around (gemba walk) • structured and unstructured interviews • formal and informal interviews • review of organisation records • review of process 'history' such as might be obtained from a control panel or other process records
Prior situation	The prior situation would include an analysis of culture and value alignment between: • downstream and upstream members of the value chain and the organisation • management and employees • skills required versus skills possessed • process capability • process and plant/equipment performance
Intended benefits	Intended benefits include impacts on: • customer perceived value • stakeholders upstream and downstream • organisation personnel • process capability • plant/equipment reliability/performance
Results of change	The change may have resulted in: • an initial improvement followed by a return to previous performance • a change which has resulted in continued

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RANGE STATEMENT	
	improvement • continued detriment or other variations over time Results of change should include HSE changes
Improvements	Improvements may: • be to process, plant, procedures or practice • include changes to ensure positive benefits are maintained
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG704A Facilitate improvements in the internal value chain

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers dealing with internal value chain members to improve the overall effectiveness of the value chain, so delivering greater value to the customer. This unit is about applying improvement practices which the team leader might have used within their own team to other teams within the value chain and covers areas where value stream issues impact on the overall ability of the organisation to continue to improve and offer better value to the customers.

Application of the Unit

Application of the unit	This unit applies to team leaders or people in equivalent positions who have contact with internal value chain members outside their own team and who are already familiar with competitive manufacturing, formal problem solving and root cause analysis, leading change, and reducing costs. Where this is not the case the following units can be completed to supply the necessary skills: • MSACMS400A Implement a competitive manufacturing system • MSACMC411A Lead a competitive manufacturing team • MCMT430A Improve cost factors in work practices • MSACMT280A Undertake root cause analysis. The unit applies to 'gate-to-gate' value chains. For skills associated with a source to destination value chains refer to MSACMG709A Facilitate improvements in the

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	external value chain. This unit does not apply to mapping or managing value chains (refer to MSACMS601A Analyse and map a value chain and MSACMS602A Manage a value chain). Where previous improvements need to be evaluated refer to MSACMG705A Undertake a qualitative review of a process change and MSACMG703A Analyse process changes. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify opportunities for continued improvement	1.1. Identify past improvements which have been implemented but have not delivered intended benefits 1.2. Identify suggested improvements which have not yet been implemented 1.3. Discuss and identify with team members new improvement opportunities 1.4. Determine which of these improvements have been or may be restricted by other value chain members 1.5. Suggest possible factors causing this restriction 1.6. Select possible improvements for further study
2. Study restrictions to further improvement with value stream member	2.1. Arrange meeting with suitable representatives of the value stream member 2.2. Outline the opportunities for improvement and any current or anticipated restrictions 2.3. Work with value stream representatives to determine root cause of restrictions 2.4. Work with value stream member to identify possible solutions to problem 2.5. Define outcomes from any proposed changes
3. Develop a consensus approach to implementing improvements	3.1. Determine benefits/costs to value stream member from the proposed changes 3.2. Determine benefits/costs to own process from the proposed changes 3.3. Decide whether the proposed improvements will result in an valuable improvement to the end customer 3.4. Determine health, safety and environment (HSE) impacts as a result of the change 3.5. Agree on proposed change/program of changes with all key stakeholders
4. Obtain required approvals	4.1. Draft a formal proposal for the proposed changes 4.2. Submit proposal for all required approvals from stakeholders 4.3. Modify proposal as required in liaison with all key stakeholders

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ELEMENT	PERFORMANCE CRITERIA
	4.4. Obtain sign off from process/system owner
5. Measure and communicate gains	5.1. Agree indicators/metrics of success of proposed changes 5.2. Make arrangements to collect the necessary data 5.3. Make arrangements for the data to be analysed and presented in an agreed format to the agreed stakeholders 5.4. Agree the communication plan 5.5. Liaise with stakeholders to implement changes as agreed and approved
6. Review change	6.1. Analyse results of change 6.2. Identify areas which have not met predicted outcome (positive or negative) 6.3. Determine cause of target not being met 6.4. Take appropriate action to improve the value chain 6.5. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making • prioritisation • communication at all levels • negotiation • situation analysis • root cause analysis
Required knowledge
• competitive manufacturing principles • organisational goals and processes • continuous improvement and the workplace improvement processes and procedures • value chain members' processes • value chain mapping and analysis • approval processes within organisation

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REQUIRED SKILLS AND KNOWLEDGE
• benefit/cost analysis methods • methods of determining the impact of a change • communication methods • customer perception of benefits

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • facilitate improvements in the value chain. In particular look for evidence of: • identifying value chain restrictions to further improvement • developing consensus solutions • jointly implementing and monitoring solutions.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with

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EVIDENCE GUIDE	
	application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Opportunities for continuous improvement	Opportunities for continuous improvement may be: • beyond those arising just from within the team and will usually be within the site (gate-to-gate) or at least the organisation
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment

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RANGE STATEMENT	
Change	Changes may: • be to plant, procedures or practice • arise from continuous improvement (or an improvement event/project • may have been intended to make an improvement or to implement new products, technology or systems • include the implementation of a change Changes do not include an engineering review of a major capital expenditure or similar review
Presentation of information	Information may be presented: • in terms of graphs or other appropriate visual forms
Stakeholders	Stakeholders include: • work team members, value chain members as well as other stakeholders
Results of change	The change may have results in: • an initial improvement followed by a return to previous performance • a change which has resulted in continued improvement • continued detriment or other variations over time
Improvements	Improvements may: • be to process, plant, procedures or practice • include changes to ensure positive benefits are maintained
Changes which have not met target	Changes which have not met target may include: • those that fall short and those that exceed expectations Appropriate action is to remove restrictions on those items which fell short, and make standard/further implement those which exceeded expectation
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions

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RANGE STATEMENT	
	• standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG703A Analyse process changes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the quantitative analysis of past changes made in the manufacturing systems, process or environment to ensure the quantum of expected change has been achieved and that gains are maintained and are used as a basis for further gains. The unit includes statistical and other mathematical analysis of data, methods for capturing data on implemented changes (quantitative and qualitative) and producing useful information from this data. It includes consultation with stakeholders both for data validation and consensus decision making for future improvements.

Application of the Unit

Application of the unit	This unit applies to team leaders, technical experts and people with a similar sphere of influence/scope of authority and responsibility who are already have a knowledge of statistics used in manufacturing and of process capability improvement and some knowledge of factorial design, the selection and analysis of appropriate metrics, and the discrimination between valid and invalid interpretations of data. Where this is not the case MSACMT450A Undertake process capability improvements and MSACMT452A Apply statistics to processes in manufacturing may be completed to supply the necessary statistical skills. If the unit is being applied to a complex change process or a complex manufacturing process, it may be an advantage to have completed MSACMT652A Design an

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	experiment before completing this unit. Where this unit is being applied in a six sigma environment then knowledge and skill in six sigma techniques may also be an advantage. MSACMT653 Apply six sigma to process control and improvement can be completed to supply these skills. The unit applies to reviews of both intended and unintended consequences of change and the effectiveness of the implementation of the change. This unit is not intended to be applied to a technical or engineering review of a major capital expenditure or similar. This unit takes a largely quantitative approach to the review. For skills associated with a more qualitative review refer to MSACMG705A Undertake a qualitative review of a process change. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse a change	1.1. Identify changes which have occurred 1.2. Select a change or group of related changes to analyse 1.3. Determine the initiation of the selected change 1.4. Identify relevant metrics and predicted values for these metrics 1.5. Gather data for these metrics prior to the change 1.6. Gather data and information on the implementation of the change 1.7. Gather data for these metrics after the change 1.8. Survey all key metrics and identify any where variations may correlate with the change being analysed 1.9. Discuss results of change with key stakeholders and identify other possible (qualitative or quantitative) results of the change 1.10. Analyse this data to determine the results of the change
2. Review results of change with stakeholders	2.1. Identify trends over time in all relevant metrics 2.2. Analyse correlated metrics to determine causal relationship 2.3. Audit health, safety and environment (HSE) impacts as a result of the change 2.4. Present information in a form understandable by stakeholders 2.5. Discuss analysed information with relevant stakeholders 2.6. Modify information based on stakeholder input as required

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ELEMENT	PERFORMANCE CRITERIA
	2.7. Develop a consensus view of the result of the change which is supported by the information available 2.8. Validate the consensus view with stakeholders
3. Identify future improvements	3.1. Discuss lessons learned from the change with stakeholders 3.2. Capture key knowledge in accordance with systems and procedures 3.3. Identify future improvements in collaboration with team members 3.4. Validate identified changes with stakeholders 3.5. Obtain sign off from process/system owner 3.6. Start the process for implementing future improvements 3.7. Check that the planned improvements are occurring 3.8. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making • communication at all levels • interviewing skills • statistics/mathematics • situation analysis
Required knowledge
• competitive manufacturing principles • organisational goals and processes • continuous improvement and the workplace improvement processes and procedures • statistical process control (SPC) and principles • methods of determining the impact of a change using quantitative analysis of process data, including advanced statistical/mathematical analysis and basic qualitative techniques

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REQUIRED SKILLS AND KNOWLEDGE
• organisation metrics • sources of data (actual and possible) within the organisation and the value chain • range of typical metrics, their applications and limitations

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • analyse process changes. In particular look for evidence of: • identification of changes • data and information gathering over a period and range that will provide a valid basis for analysis • selection and use of appropriate data analysis tools • presentation of information in a suitable form • obtaining a consensus view of the results of the change • determining the lessons to be learned and future improvements to be undertaken.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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EVIDENCE GUIDE	
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where changes include areas covered by industry codes of practice, and/or Australian/international standards, the latest version must be used
Gather prior data	Where all suitable data was not collected prior to the change a suitable proxy will be needed
Health, safety and environment	All changes implemented are expected to be at

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RANGE STATEMENT	
(**HSE**)	least neutral, or preferably beneficial, in their impact on health, safety and environment
Change	Changes may: • be to plant, procedures or practice • arise from continuous improvement (or an improvement event/project) or implementing new products, technology or systems • may have been intended to make an improvement or to implement new products, technology or systems • include the implementation of a change Changes do not include an engineering review of a major capital expenditure or similar review
Initiation of change	Changes need to be identified as either: • deliberately or not deliberately initiated Where a change was not deliberately initiated then the causal factors for the change need to be identified
Correlated metrics	Any metric which appears to show a chronological correlation with the change being analysed. These metrics need to be examined to determine if the change has a causal relationship or is simply coincidental
Presentation of information	Information may be presented: • in terms of graphs (or other appropriate visual forms) • verbally or other forms able to be understood and used by stakeholders
Stakeholders	Stakeholders include: • work team members, value chain members, as well as other stakeholders
Results of change	The change results may include: • an initial improvement followed by a return to previous performance • continued improvement • continued detriment or other variations over

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RANGE STATEMENT	
	time
Improvements	Improvements may: • be to process, plant, procedures or practice • include changes to ensure positive benefits are maintained
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG702A Review manufacturing practice tools and techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the application of continuous improvement to the use of competitive manufacturing tools and techniques; that is, facilitating the right use of the right tool at the right time and reviewing its application.

Application of the Unit

Application of the unit	This unit is intended for team leaders and people with a similar sphere of influence and scope of authority and responsibility. It covers the reviewing of competitive tools used by an organisation which has already embarked on a competitive manufacturing path and is driven by the pull of its customers. The unit includes checking that the relevant competitive manufacturing practice tools are being consistently and correctly applied across the entire organisation to enhance customer and organisation value. It also includes reviewing the processes used to identify when additional or different competitive manufacturing tools should be applied. This unit applies to individuals who have a broad knowledge of all major competitive tools with in-depth application knowledge of several tools which are relevant to the organisation and familiarity with a define, measure, analyse, improve, control (DMAIC) approach. This unit may also be applied to service organisations applying competitive manufacturing principles.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Review the use of competitive manufacturing tools	1.1. Identify which competitive tools are being used in the work area 1.2. Define the outcomes expected from each tool 1.3. Observe and measure the actual outcomes being achieved 1.4. Identify gaps between actual outcomes and planned outcomes

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Determine if the tools are being used as intended 1.6. Review tool use and determine if the most appropriate tool is being used 1.7. Audit health, safety and environment (HSE) impacts from the use of tools 1.8. Identify any system/process issues impeding the tools delivering their expected outcomes 1.9. Identify any gaps between tool capability and customer benefit requirements
2. Recommend changes to the use of competitive manufacturing tools	2.1. Define required further improvements identified 2.2. Prioritise required further improvements 2.3. Identify gaps inhibiting tool use 2.4. Recommend system and process changes as required to improve tool use 2.5. Recommend alternative or additional tools as required to achieve organisation requirements 2.6. Obtain required authorisations for changes
3. Facilitate the better use of competitive manufacturing tools	3.1. Facilitate training or other resources needed as required to improve tool use 3.2. Facilitate system and process changes as required to improve tool use 3.3. Facilitate the introduction and use of new tools as required 3.4. Initiate procedures for sustaining the changes

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• decision making • communication at all levels • situation analysis • analysis
Required knowledge
• competitive manufacturing principles

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REQUIRED SKILLS AND KNOWLEDGE
• competitive manufacturing tools, their applications and limitations • customer benefit • ways of determining competency gaps • DMAIC process applied to competitive manufacturing tool use • approvals and delegations within the organisation • procedures including processes for updating and drafting of procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • critically review the use of competitive tools. In particular look for evidence of: • taking a DMAIC approach • comparing actual outcomes to planned outcomes • discriminating between the causes of suboptimal performance • recommending appropriate changes to tools used, tool usage and/or tool implementation.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

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EVIDENCE GUIDE	
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Review tool use	Review of tool use includes: • identifying whether a better tool could have been used and whether there is an appropriate balance between daily continuous improvement and kaizen blitz
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards,

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RANGE STATEMENT	
	the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented are expected to be at least neutral, or preferably beneficial, in their impact on health, safety and environment
Outcomes	Outcomes include: • the benefits both to the organisation and also the customers
Define improvements	The definition of improvements may include: • a specification of the problem/capability gap being addressed • a specification of how that problem/gap will be solved/filled • a statement of the intended benefits of the solution • a statement of the indicators of progress and success
Organisation	Organisation includes: • any part of a manufacturing or service organisation • companies, government bodies or other body of people aiming to produce a product to service a customer
Competitive tools	Competitive tools are those techniques used to improve competitive manufacturing, typically described in the competitive manufacturing 'tools units' including: • 5S • Just in Time (JIT)/kanban • quick changeover • root cause analysis • maintenance including failure mode effects analysis (FMEA), and mean time between failure (MTBF)
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

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RANGE STATEMENT	
Gaps inhibiting tool use	Gaps inhibiting tool use may include: • competency gap of employees in own or other value chain enterprise • lack of management or employee support • lack of financial or other resources • inadequate data
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG701A Prepare for and implement change

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the establishment of the preconditions for the implementation of a change such as a 'step change' or a change resulting from a problem solving exercise such as a kaizen blitz. The unit can be applied to sub sections of an enterprise such as a team, area or department, or in the case of a small or medium sized manufacturer, to the whole enterprise.

Application of the Unit

Application of the unit	This unit is intended for team leaders and people with a similar sphere of influence/scope of authority and responsibility. It applies to individuals who are already familiar with change leadership in a competitive manufacturing environment through either previous study or industry experience. Where this is not the case MSACMC410A Lead change in a manufacturing environment may be completed to supply the necessary skills. Skills covered by this unit are applied in an organisation after a desired change has already been identified. This unit may also be applied in service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Define the change	1.1. Determine the purpose of the change 1.2. Identify key change project personnel 1.3. Record the current state that the change is addressing 1.4. Develop a consensus view of the intended future state including indicators of a successful change 1.5. Develop an agreed statement of the solution 1.6. Identify the health, safety and environment (HSE) impacts of the change 1.7. Determine the scope of the change project including taking into account the impact of the solution on any codes of practice, standards, contracts, commercial or industrial agreements

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ELEMENT	PERFORMANCE CRITERIA
	1.8. Obtain sign off from key change project personnel
2. Identify personnel required to implement the change and their roles	2.1. Develop a high level change network map 2.2. Identify employees, suppliers or customers who may be required to implement the change 2.3. Identify other demands on these people during the change 2.4. Investigate priorities, synergies and conflicts 2.5. Take appropriate action to resolve conflicts
3. Assess and manage the change related risks	3.1. Identify organisational capacity for the change including available resources and ability to absorb any disruption during the change 3.2. Clarify specific risk dimensions for this change 3.3. Develop appropriate transition approach
4. Build high level change plans	4.1. Develop high level involvement plan 4.2. Develop high level communication plan to all stakeholders 4.3. Develop high level competency development plan for all implementers 4.4. Develop high level alignment plan
5. Implement and sustain the change	5.1. Implement change plans 5.2. Check change objectives have been met 5.3. Transfer ownership of post change operations from change agents where relevant 5.4. Ensure support structures are in place 5.5. Check alignments have been obtained 5.6. Check competencies have been developed and will be maintained 5.7. Ensure base line is defined for continuous improvement 5.8. Review project and capture learning from the project 5.9. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE
Required skills
• decision making • communication at all levels • situation analysis
Required knowledge
• competitive manufacturing principles • change management • workplace strategy and vision • methods of determining competency gaps • project planning and management

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • prepare for and deliver change. In particular look for evidence of: • communication with all stakeholders • development of consensus • development and implementation of plans.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable,

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EVIDENCE GUIDE	
	physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Change project personnel	Change project personnel include: • the decision makers who determine if the proposed change may proceed and the key managers and implementers of the change

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RANGE STATEMENT	
Current state	The current state is ideally defined by existing data. Where this is not available suitable proxies should be sought
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented should be at least neutral, or preferably beneficial, in their impact on health, safety and environment
High level change network	High level change network includes groups involved in the change and who need to be committed to the change and include: • sponsors • cascading change sponsors • targets • agents • advocates • enablers • impeders
Organisation	Organisation includes: • any part of a manufacturing or service organisation • companies, government bodies or other body of people aiming to produce a product to service a customer
Key change project personnel	Key change project personnel include: • project sponsors • cascading sponsors • relevant managers • change agents
Sponsor	Project sponsors include: • those people who proposed the project and are its main supporters
Cascading sponsor	A cascading sponsor refers to: • a person who reports to a sponsor and so may be contributing on their behalf

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RANGE STATEMENT	
	A cascading sponsor works with delegated authority and responsibility
Risks	Risks include: • business risks for example over spending • market risk, for example, loss of market share • HSE risks • relationship risks, for example, to shareholders, employees, suppliers, customers or the community
Organisation capacity	Organisation capacity includes: • organisation history of implementing change • capability in change implementation • adaptability of people to change • demand for the change in the part of the organisation
Risk dimensions	Specific risk dimensions include: • impact of the solution - its potential for disruption to production, quality, delivery and budgets • readiness of people to accept the change including readiness to accept changes in role and responsibilities • availability of resources including financial, plant and equipment, and dedicated personnel
Transition approach	Transition approach will depend on the nature of the risks determined and will include: • transition style (top down/pilot/process focused/ delegated change) • degree of sponsorship to be cascaded • balance of engagement/involvement • internal and/or external resources • use of change to build organisation capacity
High level involvement plans	High level involvement plans aim to create ownership by involving groups in specific activities within defined constraints of: • objectives for involvement • decision parameters and • timing of involvement

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RANGE STATEMENT	
	The specific activities include: • problem/opportunity identification • solution design • implementation/transition planning • solution building • solution testing • solution piloting • training design • training delivery • communication roll out • solution roll out
Alignment plan	Alignment plan ensures alignment and sustainability between: • policies, processes and procedures • incentives and rewards (key performance indicators (KPIs) and intended outcomes) • consequences and penalties for non-compliance • preventing pre-change behaviours and patterns recurring
Sustaining improvement	Improvement may be sustained by including it in: • standard procedures and work instructions • standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSACMG700A Review continuous improvement processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the local level review and further development of an existing continuous improvement process.

Application of the Unit

Application of the unit	This unit is intended for team leaders and people with a similar sphere of influence/scope of authority and responsibility. It applies to individuals who are already familiar with change leadership in a competitive manufacturing environment through either previous study or industry experience. Where this is not the case MSACMC410A Lead change in a manufacturing environment may be completed to supply the necessary skills. Skills covered by this unit apply to the review of existing continuous improvement processes in a team, area or department environment, or in the case of a small or medium sized manufacturer, to the whole enterprise. This unit may also be applied to service organisations applying competitive manufacturing principles.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Review continuous improvement practice	1.1. Review performance against current key performance indicators (KPIs) 1.2. Review KPIs for ongoing relevance 1.3. Review current state of continuous improvement processes 1.4. Audit health, safety and environment (HSE) changes as a result of continuous improvement activity 1.5. Analyse problems to determine root cause/s 1.6. Identify areas for improvement to KPIs and continuous improvement processes
2. Develop plan for enhancing improvement	2.1. Prioritise areas requiring action 2.2. Develop a range of possible solutions including taking into account the impact of the solution on any

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ELEMENT	PERFORMANCE CRITERIA
processes	codes of practice, standards, contracts, commercial or industrial agreements 2.3. Discuss possible solutions and implications with stakeholders 2.4. Compare outcomes from possible solutions to competitive philosophy 2.5. Choose actions which are most compatible with competitive philosophy 2.6. Draft implementation plan for chosen action 2.7. Obtain required approvals and modify plan as required
3. Implement enhanced improvement process	3.1. Communicate changes to improvement processes to team members 3.2. Resolve issues and problems identified by team members 3.3. Obtain sign off from process/system owner 3.4. Arrange for skills development as necessary 3.5. Arrange for required resources to be available 3.6. Establish and implement KPIs for modified continuous improvement process 3.7. Implement planned changes 3.8. Check the planned improvements have occurred 3.9. Take action to sustain improvement by standardising

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• problem solving and decision making • communication across all levels in an organisation • the ability to analyse current state/situation • the ability to analyse workplace strategy and vision statements and principles and to link these to current processes, performance and indicators
Required knowledge
• competitive manufacturing principles

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REQUIRED SKILLS AND KNOWLEDGE
• competitive manufacturing tools, their applications and limitations • methods of determining competency gaps • continuous improvement processes • types of KPIs and their impacts on performance • relationship between maintenance and continuous improvement

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Demonstrates skills and knowledge required to: • critically review continuous improvement processes. In particular look for evidence of: • ongoing review of processes • development of improvement plans • implementation of improvement plans.
Context of and specific resources for assessment	Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Manufacturing Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of

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EVIDENCE GUIDE	
	workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application. • Assessment may be applied under project related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice/standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used
Health, **safety and environment** (**HSE**)	All changes implemented should be at least neutral, or preferably beneficial, in their impact on health, safety and environment
Organisation	Organisation includes: • any part of a manufacturing or service organisation • companies, government bodies or other body

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RANGE STATEMENT	
	of people aiming to produce a product to service a customer
Relevance	Relevance of KPIs includes: • appropriateness - did they lead to/encourage desirable performance • currency - are they still encouraging desirable performance • unintended consequences - do they lead to outcomes which are not desirable (even if some performance is desirable) • signal/noise - is the balance between desirable and undesirable outcomes strong and positive
Compare outcomes	Outcomes include comparing: • cost/benefit • timing • value chain implications • HSE issues • process reliability issues • benefit to customer/perceived customer value
Competitive philosophy	Competitive philosophy includes that body of knowledge and techniques which together guides an organisation towards achieving best practice in their processes and includes knowledge and techniques listed under various titles such as: • manufacturing practice • lean manufacturing • agile manufacturing
Required resources	Required resources include: • plant • materials (raw materials, components, work in progress, other consumables) • energy (heating, cooling, fuel) • people • skills • finances • feedback/visual factory resources • measuring equipment
Sustaining improvement	Improvement may be sustained by including it in:

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RANGE STATEMENT	
	• standard procedures and work instructions • standard practice • other relevant documents and practices
Team leader	Team leader may include: • any person who may have either a permanent or an *ad hoc* role in facilitating the function of a team in a workplace

Unit Sector(s)

Unit sector	CM Graduate

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PMASUP620B Manage environmental management system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the scoping, establishment and review of the environmental management system in regard to environmental sustainability as an integral part of business planning.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*PMASUP520B*	*Review procedures to minimise environmental impact of process*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the	Performance criteria describe the performance needed to demonstrate

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essential outcomes of a unit of competency.	achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish an environmental management system.	1.1. Select an appropriate Environmental Management System as a model for the enterprise/plant 1.2. Develop environmental management policies that reflect the organisation's commitment to environmental sustainability as an integral part of business planning and as a business opportunity 1.3. Establish strategies to encourage all stakeholders to meet high standards of environmental performance and support sustainable innovation and continuous improvement 1.4. Establish policies and procedures to incorporate and support triple bottom line principles 1.5. Establish policies/procedures which minimise environmental impacts 1.6. Check policies conform to current regulatory requirements 1.7. Address environmental management at the planning, design and evaluation stages to ensure that any changes in the workplace are identified for ongoing impact and opportunity.
2. Manage innovation and improvement.	2.1. Identify, evaluate and take into consideration changing trends and opportunities relevant to the organisation for ongoing improvement programs 2.2. Promote continuous improvement and sustainable innovation as an essential part of doing business and as a context for assessment and planning of environmental performance 2.3. Establish continuous improvement and innovation policies and procedures that include training and professional development to optimise the environmental performance of the organisation 2.4. Establish a system to analyse and communicate the costs and benefits of innovations and improvements and to measure, monitor and record environmental performance 2.5. Establish performance benchmarks and indicators and set targets to maximise continuous improvement.
3. Review	3.1. Develop processes to ensure that an integrated ongoing

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ELEMENT	PERFORMANCE CRITERIA
environmental management system.	review is part of the organization policy and procedures 3.2. Promote improvement and sustainable innovation to organisational performance by ongoing evaluation and assessment, and changes to policies.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• communication/consultation skills • conflict resolution skills • planning and evaluation skills • process analysis skills • problem solving skills.
Required knowledge
The person must demonstrate understanding of specialised knowledge with depth in some areas. Required knowledge is to be limited to that which is sufficient to perform the particular management function and is intended to promote environmental awareness rather than technical environmental competencies. These would include: • relevant legislation from all levels of government that effects business operation, especially in regard to OHS and environmental issues, EEO, industrial relations and anti-discrimination • concepts of policy development and business planning • relevant system analysis and design principles • performance benchmarking and indicator development relevant to the organisation's activities • environment sustainability as a 'whole system' approach • techniques to measure sustainability • quality systems • supply chain management • strategies to maximise opportunities • environment impact minimisation strategies • relevant knowledge of environmental issues, especially in regard to water catchments, air, noise, ecosystems, habitat, waste minimisation

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REQUIRED SKILLS AND KNOWLEDGE
• relevant knowledge of ecological systems in regard to business operation.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to develop and establish environmental management policies, systems and procedures in regard to managing sustainable business practices while encompassing environmental sustainability as an integral part of business planning. Evidence must be strictly relevant to the particular management role and is not intended to include detailed technical aspects of environmental science. Consistent performance should be demonstrated. In particular look to see that: • communication/consultation skills to ensure all relevant groups and individuals are advised of what is occurring and are provided with an opportunity for input

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EVIDENCE GUIDE	
	• conflict resolution skills to mediate, negotiate and/or attempt to obtain consensus between parties • planning and evaluation skills to develop policies and procedures • process analysis skills to identify potential environmental impacts and opportunities • problem solving skills to deal effectively with environmental impacts and opportunities as identified • ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities. These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork units, communication units and units relevant to the process equipment. In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Triple Bottom Line (**TBL**) **Principle**	The 'Triple Bottom Line' (TBL) principle is used as a framework for measuring and reporting corporate performance against economic, social and environmental parameters. It involves the focus of an enterprise being not just on the economic value they add, but also on the environmental and social value they can add.
Sustainable development	Sustainable development is defined as 'Development which meets the needs of the present without compromising the ability of future generations to meet their own needs'. From a business perspective, sustainable development involves the integration of this objective with the need for business growth and expansion. Effective and innovative environmental management can contribute to business growth by reducing costs, differentiating goods and services and contributing to improved corporate image and staff relations.
Environmental performance	Environmental performance may be defined as the measure of an organisation's impact on the environment and their ability to manage and minimise negative impacts.
Legislation, **codes and national standards**	Legislation, codes and national standards relevant to the workplace which may include: • relevant Commonwealth and State Environment Acts • applicable State environmental regulations • licences and permit conditions • Codes of practice • Australian standards • environmental treaties and conventions • national environmental policies, strategies and initiatives such as the National Greenhouse Strategy, National Strategy for Ecologically Sustainable Development etc. • National Pollutant Inventory • State of the Environment Reports

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RANGE STATEMENT	
	• Industry Association commitments (eg The Global Mining Initiative) Environmental management policies must be: • relevant to the organisation's operations • appropriate to the scope and scale of the business.
Environmental Management Policies	Environmental management policies may include: • local, national and international innovations, programs and ideas • business sustainability • environmental load reduction • waste minimisation • tenders for the provision of goods and services that specify environmentally preferred selection criteria • protection of land and habitat • ecological considerations • regeneration of damaged ecosystems • media releases as a result of incidents • environmental reporting • communication strategies to ensure all stakeholders are informed of initiatives and to promote achievements to the wider community.
Knowledge of legislation, **codes**, **national standards**, **industry codes of practice and workplace policies and procedures**	Knowledge of legislation, codes, national standards, industry codes of practice and workplace policies and procedures must: • be strictly relevant to the particular workplace and is not intended to include detailed technical aspects of environmental science • details of legislation must be directly relevant to the workplace • be consistent with the concept that people at this level will be dealing with environmental concepts as part of an overall management responsibility and not as an environmental specialist.
Environmental improvement plans	Environmental improvement plans may be established at management level and may include: • measuring, monitoring and recording environmental performance and continually setting targets for measurable improvements • all aspects of environmental performance including energy and other resources use, waste minimisation, recycling, transport use.

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RANGE STATEMENT	
Environmental sustainability	Environmental sustainability may be influenced by: • the organisational culture and operations • internal or external economic climate • political climate • market focus/considerations • environmental impacts of the business operation.
Stakeholders	Stakeholders may include: • board members, financial backers, owners • all members of the organisation, including management and staff members • suppliers • contractors • others acting on the organisation's behalf • customers • external individuals or bodies who may have an interest in or may be affected by the organisation.
Maximising opportunities	Maximising opportunities may involve: • improved environmental performance • increased efficiency • use of alternative energy sources and may improve/enhance: • corporate image • staff morale • cost reduction • product differentiation/branding • identification of market potential.
Environmental impact	To minimise environmental impact may include the minimisation of: • waste/pollution • emissions/spills • use of resources, especially reduction of use of non-renewable resources.
Continuous improvement and innovation policies	Continuous improvement and innovation policies may include: • consistent reviewing activities in search of a better way • improving the organisation in all aspects of its operation • and may look at life cycle impacts of the organisation including:

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RANGE STATEMENT	
	• activities and products are designed to minimise life cycle impacts and maximise opportunities • tendering and purchasing processes that include life cycle criteria • product design and manufacture • packaging policies • product use and disposal • vehicle policies that include use of cleaner fuels or alternative energy sources and regular servicing intervals to reduce pollution and improve efficiency.
Performance benchmarks	Performance benchmarks and targets may include: • best practice or industry codes for the industry/sector • levels of performance expected of organisation sectors and/or the organisation as a whole.
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPMSUP390A Use structured problem solving tools

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the solving of process and other problems, beyond those associated directly with the process unit/equipment, using structured process improvement tools to identify improvements and/or solve problems.

Application of the Unit

Application of this unit

The competency is typically performed by an experienced operator, team leader or supervisor.

Generally the person would be part of a team during the solving of complex or systemic problems and would be expected to perform all parts of this unit and at all times would be liaising and cooperating with other members of the team. This includes:

- using a range of formal problem solving techniques
- identifying and clarifying the nature of the problem
- devising the best solution
- evaluating the solution
- developing an implementation plan to rectify the problem.

This unit does not cover the solving of problems undertaken as part of the operator's normal role which is covered in the relevant operation competency unit.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

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Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify the problem.	1.1 Identify variances from normal operating parameters and product quality. 1.2 Define the extent, cause and nature of the problem by observation and investigation. 1.3 State and specify the problem clearly.
2. Determine fundamental cause of problem.	2.1 Identify possible causes based on experience and the use of problem solving tools/analytical techniques. 2.2 Develop possible cause statements. 2.3 Identify fundamental cause.
3. Determine corrective action.	3.1 Consider all possible options for resolution of the problem. 3.2 Consider strengths and weaknesses of possible options. 3.3 Determine corrective action to remove the problem and possible future causes. 3.4 Develop implementation plans identifying measurable objectives, resource needs and timelines in accordance with safety and operating procedures. 3.5 Develop recommendations for ongoing monitoring

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	and testing.
4. Communicate recommendations.	4.1 Prepare report on recommendations. 4.2 Present recommendations to appropriate personnel. 4.3 Follow up recommendations if required.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Competence includes a thorough knowledge and understanding of the process, normal operating parameters, and product quality to recognise non-standard situations.

This unit of competency includes use of analytical techniques in problem solving such as:

- brainstorming
- fishbone diagrams/cause and effect diagrams
- process logic/process requirements
- logic tree
- similarity/difference analysis
- Pareto analysis
- force field/SWOT analysis
- flow charts
- control charts, runcharts and graphs
- scattergrams.

Action plans to solve problems are prepared including:

- priority requirements
- measurable objectives
- resource requirements
- methods for reaching objectives
- timelines
- coordination and feedback requirements
- safety requirements
- risk assessment
- environmental requirements.

Language, **literacy and numeracy requirements**

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This unit requires the ability to read and interpret typical product specifications, job sheets and material labels as provided to operators.

Writing is required to the level of report writing and completing workplace forms.

Basic numeracy is also required, eg to interpret quality data and graphs.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to apply and explain:

- relevant equipment and operational processes
- enterprise policies and procedures
- enterprise goals, targets and measures
- enterprise quality, OHS and environmental requirements
- principles of decision-making strategies and techniques
- enterprise information systems and data collation
- industry codes and standards.

Consistent performance should be demonstrated. For example, look to see that:

- problems are recognised and clarified
- possible causes are identified, based on experience and use of analytical techniques in solving the problem, including:
  - identifying variations
  - identifying cause and effect
  - separating single problems from multiple problems
  - recognising recurring problems.
- fundamental cause of process or equipment faults is determined
- corrective/preventative implementation plans are developed to avoid recurrence of the problem
- implementation plan is presented to relevant personnel.

Assessment method and context

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Assessment will occur on the job or in a simulated workplace.

Competence in this unit may be assessed:

- in a situation allowing the generation of evidence of the ability to recognise and respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

The competency unit applies to a wide range of processes and equipment. The process manufacturing technical units of competency include a problem solving element where problems specific to that competency unit are to be resolved. This competency unit is where structured problem solving techniques are to be applied more broadly, or with greater depth/rigour than is implied by the problem solving element of the technical units.

In large plants or manufacturing organisations with multiple processes, it may apply to more than one process if those processes interact with each other. It applies to all operators across all functions.

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Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include leaks, spillages and equipment hazards that can occur during the walk-through of a plant.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- non- routine process and quality problems
- equipment selection, availability and failure
- teamwork and work allocation problems
- safety and emergency situations and incidents.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS510A Manage risk

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This unit covers the development, implementation and evaluation of a risk management plan for the organisation. It incorporates an assessment of all potential risks facing the organisation and the development of strategies and plans to mitigate all risk situations through elimination, isolation or protection.

Application of the Unit

Application of this unit

This competency applies to managers or OHS specialists who are developing or maintaining a risk management plan for their site or organisation. This unit was based on the Australian Risk Management standard AS/NZS4360, 1999 and as such may be applied quite broadly. However, it is probably best applied to health, safety and environment risks and the business and other risks consequent on them. For general business and finance risk units refer to the Finance Training package FNB04.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *MSAOHS401A Assess risk*.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Develop risk management plan.	1.1 Analyse and interpret strategic position and policy on risk management. 1.2 Ensure that an audit is conducted to identify risk management context and potential areas of risk. 1.3 Analyse organisational capability to reduce/control the likelihood of both incidents and consequences. 1.4 Evaluate the risk register to ensure it contains relevant information regarding sources of risk, scenarios for loss of control of the risk, possible consequences, risk controls and action. 1.5 Establish or review risk management policies. 1.6 Evaluate the requirement for training/education for all groups and individuals. 1.7 Identify access to external specialist assistance. 1.8 Establish procedures for ongoing identification of hazards, and assessment and control of risk. 1.9 Consult stakeholders in the development of the plan.
2. Implement risk management plan.	2.1 Review, in consultation with stakeholders, the ranking of risks and the classifications of levels of risk. 2.2 Place on a monitor/review watch list risks classified as low/acceptable. 2.3 Implement processes to eliminate wherever practicable risks that are unacceptable.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	2.4 Implement processes to mitigate/minimise risks that cannot be eliminated in accordance with the risk management plan and the hierarchy of control. 2.5 Document strategies for risk minimisation.
3. Evaluate risk management plan.	3.1 Establish procedures to regularly review risk management activities. 3.2 Ensure stakeholders have input to the review. 3.3 Examine activities that do not achieve their objective/ performance outcomes to determine cause. 3.4 Identify targets for improvement and update plan. 3.5 Establish evaluation of risk management as a key component of all projects/activities.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

The person must demonstrate understanding of specialised knowledge with depth in some areas. Required knowledge is to be limited to that which is sufficient to perform particular risk management functions. Competence includes the ability to apply and explain:

- relevant legislation from all levels of government that effects business operation, especially in regard to OHS and environmental issues, EEO, industrial relations and anti-discrimination
- the legal implications of deeming identified risks as acceptable
- strategic, tactical and operational plans of the organisation
- legal requirements for operating the business relevant to the area of responsibility
- relevant awards and industrial agreements
- workplace standards for OHS and environmental management
- internal or external audit methods
- focus groups processes
- hazard analysis processes
- investigation reports
- review of data such as hazard and incident reports, maintenance records, production records.

Language, **literacy and numeracy requirements**

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This unit requires the ability to communicate high level material using all modes of communication to all levels.

Writing is required to the level of writing reports, policies and procedures.

Numeracy interpret and manipulate technical data.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Where the assessee does not currently possess evidence of competency in *MSAOHS401A Assess risk*, it may be co-assessed with this unit.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- develop, implement and evaluate the development of plans to eliminate
- isolate or protect people (and/or equipment) in the event of the potential negative event occurring.

The emphasis should be on the ability to avoid/eliminate critical incidents rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look for:

- communication/consultation skills to ensure all relevant groups and individuals are briefed, consulted and have an opportunity to input
- negotiation skills to mediate, negotiate to obtain consensus between individuals/groups on the risk management plan and (where required and appropriate) categorisation of risks
- ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
- ability to apply a systematic process to development and documentation of plan and implementation of actions.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the workplace, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.

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Assessment method and context

Assessment will occur in an industrial site/plant and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- on an appropriate, industrial plant/site
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

Persons and organisations engaged in assessing managers in this unit need to have appropriate qualifications and experience in risk management as well as workplace assessment.

Risk management is the systematic process that is directed towards identifying hazards, assessing the risk and developing controls to minimise the risk and monitor the effectiveness of the controls (and taking action as required).

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Relevant groups and individuals refers to those personnel who have knowledge about the issue being dealt with and the expertise to assist the decision making process.

External specialist assistance refers to any group or individual in the community who has the expertise to assist the organisation to deal with any event/incident which may occur.

Risks

Risks may include:

- injury or disease
- environmental
- product failure
- financial/economic loss/failure
- damage to property/plant/equipment
- industrial disputes
- professional incompetence
- natural disasters
- security failure (including criminal or terrorist activities)
- equipment/system failures
- political events.

Legislation etc

Legislation, codes and national standards relevant to the workplace may include:

- award and organisation agreements and relevant industrial instruments
- relevant legislation from all levels of government that affects business operation, especially in regard to OHS, environmental issues, EEO, industrial relations and anti-discrimination
- relevant industry codes of practice.

Risk ranking

Risk ranking is a highly subjective process of rating risks according to their severity and likelihood. Common ranking systems are based on matrices or nomograms.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Unit Sector(s)

Not applicable.

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MSAENV672B Develop workplace policy and procedures for environmental sustainability

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to develop and implement a workplace sustainability policy, including the modification of the policy to suit changed circumstances. This unit is based on the sustainability guideline standard GCSSUS03A Develop workplace policy and procedures for sustainability.

Application of the Unit

Application of the unit	This competency applies to team leaders/supervisors/managers who are required to develop approaches to environmental sustainability within workplaces, including the development and implementation of policy. It includes: • Communicating with relevant stakeholders • Developing and monitoring sustainability policies • Reviewing and improving sustainability policies. This competency applies to all sectors of the manufacturing industry. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an organisation and across different industry sectors.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop workplace sustainability policy.	1.1 Define ***scope of sustainability policy***. 1.2 Identify and consult ***stakeholders*** as a key component of the policy development process. 1.3 Review environmental sustainability ***strategies*** relevant to all stages of work covered by the policy 1.4 Make recommendations for policy options based on likely effectiveness, timeframes and cost. 1.5 Develop policy is that reflects the organisation's commitment to sustainability as an integral part of the

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ELEMENT	PERFORMANCE CRITERIA
	business planning and as a business opportunity. 1.6 Agree upon appropriate methods of implementation.
2. Communicate the policy.	2.1 Promote the policy, including its expected outcome to key stakeholders. 2.2 Inform those involved in implementing the policy as to outcomes expected, activities to be undertaken and responsibilities assigned.
3. Implement the policy.	3.1 Develop and communicate procedures to help implement the policy. 3.2 Implement ***strategies*** for continuous improvement in resource efficiency. 3.3 Establish record systems for tracking continuous improvements in sustainability approaches and assign responsibilities.
4. Review policy implementation	4.1 Record outcomes and provide feedback to key personnel and stakeholders. 4.2 Investigate success or otherwise of policy. 4.3 Monitor records to identify trends that may require remedial action, and use to promote continuous improvement of performance. 4.4 Modify policy and or ***procedures*** as required to ensure improvements are made.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- developing and implementing systems and procedures to aid in the achievement of sustainability in the workplace
- applying quality assurance systems relevant to own enterprise
- accessing and applying other relevant enterprise polices, procedures and protocols
- relevant industry competency
- interpreting business/strategic plans

This unit requires the ability to:

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REQUIRED SKILLS AND KNOWLEDGE
• read and evaluate complex and formal documents such as policy and legislation • research, analyse and present information • prepare written reports requiring precision of expression and language and structures suited to the intended audience • adjust communication to suit different audiences • deal with different points of view and dissenting stakeholders.
Required knowledge
Required knowledge includes: • understanding of relevant policy development and implementation processes and practices • understanding of the principles, practices and available tools and techniques of sustainability management relevant to the particular industry context • best practice approaches relevant to own work area • equal employment opportunity, equity and diversity principles and occupational health and safety implications of policy/s being developed

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to develop and implement integrated sustainability policies and procedures within an enterprise. The review of the policy after implementation will also need to be evidenced.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • develop relevant policy and procedures that comply with the regulatory requirements and business plans • develop a workable implementation strategy • include measurable criteria for reviewing improvement. Consistent performance should be demonstrated. For

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EVIDENCE GUIDE	
	example, look to see that: • policy implementation is reviewed • policy is developed to be become part of the routine practices of the organisation.
Context of and specific resources for assessment	This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace • using targeted questioning for appropriate portions • through use of specific project(s) • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally

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EVIDENCE GUIDE	
	appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Scope of sustainability policy	Scope of sustainability policy include:
	• The area/s of environmental sustainability to be targeted and whether social and economic sustainability will be incorporated
	• The parts of the enterprise to which it is to apply, including whether it is for the whole enterprise, one site, one work area or combinations of these
	• An investigation of the particular business and market context of the industry/ enterprise
	• Addressing sustainability initiatives through reference to standards, guidelines and approaches such as:
	  • ISO 14001 Environmental Management Systems
	  • Life Cycle Analyses

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RANGE STATEMENT	
	• Cradle to grave/cradle to cradle • Global Reporting Initiative • Ecological Footprint Assessment • Triple Bottom Line reporting • Product Stewardship.
Stakeholders	Stakeholders include individuals and groups both inside and outside the organisation that have some direct interest in the enterprise's conduct, actions, products and services, including: • employees at all levels of the organisation • customers • suppliers • regulators • other organisations.
Strategies	Implementation strategies include: • awareness raising among stakeholders • training of staff in principles and techniques of sustainability • promotional activities. Continuous improvement strategies include ongoing measuring, improving and monitoring such as: • Plan, do, check, act cycles • Kaizen (continuous improvement) • Kaizen blitz (breakthrough improvement event) • Six sigma approaches Environmental sustainability strategies include: • reducing toxic material and hazardous chemical use • minimising resource use through changes in processes, facility design and management • supply chain and life cycle management approaches • sourcing renewable energy and low carbon footprint materials • reducing, re-using, recycling and waste

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RANGE STATEMENT	
	reduction • product and process improvements • carbon offsets • reducing greenhouse gas and other emissions

Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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MSACMT681A Develop a proactive maintenance strategy

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop and implement a predictive maintenance strategy for a manufacturing enterprise. The unit recognises that there are a number of predictive or proactive maintenance strategies such as TPM, RCM.

Application of the Unit

Application of the unit	In a typical scenario, an organisation engaged in ***competitive manufacturing*** also adopts proactive maintenance strategies. The initial development and implementation will need to be managed as will subsequent changes to the strategy. The unit covers the selection of appropriate strategies, techniques and tools and adopting them to the organisations needs. It also covers the application of the strategies to new areas and the improvement of operation in existing areas. This would typically be done in a team environment and in consultation with all key stakeholders. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to develop and implement a predictive maintenance strategy. Strategies will incorporate maintenance requirements of relevant technology. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into maintenance strategies.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine appropriate analytical techniques	1.1. Liaise with key stakeholders to determine objectives of maintenance strategy 1.2. Examine current maintenance situation to determine major areas requiring improvement 1.3. Compare possible ***strategies***, ***techniques*** and ***tools*** against organisation needs 1.4. Select possible strategies, techniques and tools 1.5. Confirm selected strategies, techniques and tools with key stakeholders
2. Develop reliability	2.1. Select preferred maintenance strategy

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ELEMENT	PERFORMANCE CRITERIA
strategies	2.2. Examine and adapt strategy to organisation needs and priorities 2.3. Examine and adapt techniques and tools required to implement strategy 2.4. Liaise with key stakeholders to develop an implementation plan 2.5. Identify key information and performance indicators required
3. Implement strategy	3.1. Identify data collection required 3.2. Identify hardware and other resources required 3.3. Identify skill needs required in consultation with key stakeholders 3.4. Ensure all resources/training are available 3.5. Implement strategy
4. Monitor implementation of strategy	4.1. Compare information/performance indicators with desired levels 4.2. Liaise with key stakeholders regarding strategy issues 4.3. Identify areas requiring adjustment 4.4. Make required adjustments

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication • teamwork • analysis • problem solving • mathematics • planning • reading and interpreting engineering specifications/drawings • computer use • prioritising • recording data

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge
• characteristics and strengths of different types of strategies, techniques and tools such as TPM, RCM, MTBF, FMEA, condition monitoring, RCA • holistic costs of different strategies combining cost of maintenance with costs of lost production, sales etc as relevant to the organisation • business goals sufficient to match the strategy to the business needs • strategic thinking and its application to proactive maintenance • principles of process equipment and how to improve its reliability • resources required and how to obtain them

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to select appropriate strategies, techniques and tools and adapt them to the organisations needs. They will also be able to apply the strategies to new areas and improve their operation in existing areas.
What are the specific resource requirements for this unit?	Access to an organisation using, or about to use, predictive maintenance strategies.
In what context should assessment occur?	Assessment will need to occur in an organisation using, or about to use, a predictive maintenance strategy or a case study or project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other relevant maintenance units and technical units related to the techniques and tools. This unit is related to: • *MSACMT280A Undertake root cause analysis* • *MSACMT281A Contribute to the application of a proactive maintenance strategy*, **and** • *MSACMT481A Undertake proactive maintenance analyses*

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EVIDENCE GUIDE	
	which cover different aspects/levels of this area.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	If evidence is provided from the initial introduction of a predictive maintenance strategy or a significant maintenance strategy, then one development and implementation may provide sufficient evidence. Where evidence is from the ongoing improvements of an existing strategy, then it will be needed from a range of activities to provide sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive	Competitive manufacturing is used to describe the range

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RANGE STATEMENT	
manufacturing	of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Strategies and techniques	***Total Preventative Maintenance***/***Total Productive Maintenance*** (***TPM***) is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing Overall Equipment Efficiency (OEE). ***Reliability Centred Maintenance*** (***RCM***) moves maintenance from reactive, or even planned/programmed towards a focus on uptime and OEE ***Root Cause Analysis*** (***RCA***). There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem. ***Uptime*** refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%.

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RANGE STATEMENT	
	Overall Equipment Efficiency (***OEE***) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account losses due to rejects, re-works and start up waste. ***Mean Time Between Failure*** (***MBTF***) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MBTF is reducing, then it is an indicator that the maintenance regime is failing. ***Failure Mode and Effects Analysis*** (***FMEA***) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique (such as HAZOP) for design and modification. ***Hazard and Operability Studies*** (***HAZOP***) is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability. ***Condition monitoring*** involves often quite sophisticated monitoring of equipment including such things as vibration monitoring, instrumental analysis of lubricating oil etc to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.

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RANGE STATEMENT	
Tools	Tools selected will vary with the selected strategy and techniques. Tools should be compatible with the strategy and techniques chosen. This unit does not cover the use of selected tools. Tools may include root cause analysis, condition monitoring, maintenance/breakdown history, manufacturer's recommendations

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT675A Facilitate the development of a new product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the knowledge and skills required to develop a new/evolutionary product within an existing range of products and encompasses design for manufacture and the facilitation of its initial production. This unit is based on *PMBTECH601A Develop a new product*

Application of the Unit

Application of the unit	This competency applies to people who develop new products to meet a specified end use. This will involve working closely with a range of management and operations personnel and requires balancing the business and technical sides of the new product and would typically be done as part of a cross functional team. This unit of competency applies to the technical expert. Critical aspects for success include: • ensuring the technical performance meets the customer's needs • making sure the market needs of cost, timeliness and quality are appropriately balanced • designing a product and process which can be efficiently made by the company • liaising with the required people to ensure tooling design and manufacture and equipment modification is correct • optimising the process for the new product at the completion of the development phase. This competency is typically performed by high level staff, working as part of a product design, development

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	and implementation team and taking a lead technical role. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Team work, problem solving, initiative and enterprise, and planning and organising are required to facilitate the development of a new product. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into competitive manufacturing strategies. This unit of competency assumes the knowledge component included in the following unit of competency. Evidence must be available that the specified knowledge has been acquired and is able to be applied: *MSACMT452 Apply statistics to processes in manufacturing*

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT452 Apply statistics to processes in manufacturing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be

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	consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm design brief of new product in consultation with relevant people	1.1. Communicate with customer and other key stakeholders and agree on technical specification, aesthetic requirements, timelines, cost and other market requirements 1.2. Determine regulatory/industry code/intellectual property requirements for product 1.3. Identify possible ***tooling***/***process***/***equipment*** needs 1.4. Develop design brief, including relevant drawings, to meet needs 1.5. Obtain 'sign off' on total design brief from all relevant persons
2. Determine material requirements for product	2.1. Select appropriate materials/combination of materials/ components in liaison with key stakeholders 2.2. Determine material/component testing and evaluation regime required to meet product end use requirements, including ***regulatory***/industry code requirements 2.3. Arrange for, testing and evaluation of trial materials/ components 2.4. Guide material trial process and interpret material trial results 2.5. Determine final materials/components specifications and details of value chain
3. Determine process requirements for product	3.1. Select appropriate process to make product in liaison with key stakeholders and based on ***relevant factors*** 3.2. Determine any special process/equipment requirements for this product 3.3. Communicate with production personnel to determine their concerns and/or training or other needs 3.4. Adjust the design as required to satisfy customer and production needs
4. Ensure process needs for	4.1. Liaise with equipment design/procurement

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ELEMENT	PERFORMANCE CRITERIA
new product have been met	personnel 4.2. Interpret hardware specifications and ensure they are appropriate for the job required 4.3. Liaise with process personnel to ensure appropriate draft procedures for new product have been developed 4.4. Validate product cost and design meets objectives
5. Trial new product through the process	5.1. Design trialing procedure to deliver required information 5.2. Liaise with relevant stakeholders 5.3. Ensure health safety and environment (HSE) requirements are stringently observed 5.4. Coordinate the trialing of the new product 5.5. Interpret product trial results and guide product trial process 5.6. Tune process to optimise production of new product
6. Determine process capability	6.1. Plot appropriate statistical process control charts 6.2. Determine confidence limits 6.3. Compare confidence limits with product specification
7. Coordinate product trials	7.1. Determine product testing and evaluation regime required to meet end use requirements, including regulatory/industry code requirements 7.2. Arrange for testing and evaluation of trial product/prototype 7.3. Interpret product trial results and guide product trial process 7.4. Determine final product specification in liaison with key stakeholders 7.5. Make required changes to materials, process and equipment
8. Implement standard procedures for new product	8.1. Monitor initial production and, in liaison with appropriate team members, adjust process, conditions and materials to ensure the product and process outcomes conform to requirements 8.2. Ensure process specifications are updated and reflect the optimised operation developed 8.3. Ensure standard operating procedures are correct

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ELEMENT	PERFORMANCE CRITERIA
	for the new product 8.4. Ensure equipment and other hardware records are updated to reflect additions/changes 8.5. Ensure project records are complete and all required reports have been completed and submitted 8.6. Archive records according to company procedure

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

Competence includes the ability for the practical completion of the job to:
• select and justify the selection of:
  • type of material/material specification
  • appropriate process for a range of product/market applications
  • material and product testing procedures
• apply theoretical principles to predict:
  • properties of product based on materials selected
  • effects of processes and processing on the final properties of the product
• mathematically determine:
  • product cost estimates
• interpret and make recommendations based on:
  • field test results
  • market analysis data
  • trailing data.

Required knowledge
• Knowledge and understanding of the materials, equipment and process sufficient to choose an appropriate combination of materials and process to achieve the end use function of the product. • Knowledge of the enterprise's procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards.

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	There should be evidence of successfully designed products.
What are the specific resource requirements for this unit?	Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.
What critical aspects of evidence are required to demonstrate competency in this unit?	The critical aspect for this unit of competency is the ability to apply a thorough understanding of materials and components, their grades and properties and the effects of processing to a new situation and use this understanding to predict likely solutions to the new product design specification challenge. This understanding of material/component and process interactions should also be able to be applied in interpreting data and making adjustments to materials/components and process to achieve the desired outcomes.
Language, **literacy and numeracy requirements**:	This unit requires high levels of numeracy and literacy with the ability to write and interpret technical specifications and reports. Advanced numeracy allowing the calculation and interpretation of statistics, product formulae and process conditions is also required.
In what context should assessment occur?	Competence in this unit may be assessed: • by observation of an actual product development project where the assessee takes a lead technical role • by use of a suitable product development project where arrangements are made to also assess the implementation aspects. The development must be of a product which is new to the organisation and not just a modification of an existing product. It is possible that a major redesign of an existing product may encompass all the aspects of a new product design to an

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	appropriate breadth and depth. Where the only available product design projects are the major redesign of an existing project, normally several such projects will be required to match the breadth and depth of skills which can be demonstrated by the development of a totally new product. In all cases it is expected that practical assessment will be supported by targeted questioning to assess the underpinning knowledge and theoretical assessment will be supported by appropriate practical/simulation or similar assessment.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed with other relevant units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence from one major product design or a number of product improvements should be available.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for

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RANGE STATEMENT different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Processes and policies	This competency unit is for the design of a new product 'from scratch'. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally. The competency assumes a working knowledge of all main processes and materials so that an informed choice can be made between them. All operations are performed in accordance with standard procedures and policies.
Tools and equipment include	• understanding of use of all standard processing equipment • relevant personal protective equipment.
Typical regulatory requirements include:	• Occupational Health and Safety (OHS) • environmental regulations • structural codes • product/industry specific requirements.
Typical problems include:	• defining product end use requirements in terms meaningful to the product design and manufacture • matching suitable materials and processes to the product needs and company expertise and facilities • matching (and improving) process capability to product tolerances.
Relevant factors may include:	• type of material • dimensional precision of product • length of run/number of products • required aesthetics • size and complexity of product • available capital funding • process equipment available • HSE.

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Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT671A Develop and manage sustainable environmental practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to identify opportunities for and make improvements in sustainable environmental practices in production, maintenance and logistics. Areas covered include efficient use of raw materials, management of waste, electricity conservation, heat conservation and management, water management, environment protection and environment obligations of enterprises.

Application of the Unit

Application of the unit	This is the highest level sustainable environmental practices unit in the CM. In a typical scenario, there is a need to reduce ***waste*** in the ***value chain***. Part of this is the cost of ***environmental resources*** to the process. Some of this is ***necessary waste*** but a large part of environmental resource use may be ***unnecessary waste*** and so should be totally eliminated. In order to make these savings, there is a need to analyse environmental resource use and cost in all its forms and then develop and implement plans for the more efficient use of energy. This unit primarily requires the application of communication and problem solving skills associated with collecting and analysing information. An ability to analyse resource use of technology or processes will be applied. Initiative and enterprise, and planning and organising are also required to develop plans for efficient resource use. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into the development of

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	processes.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse resource use	1.1. Identify all resource consuming processes 1.2. Determine quantity and nature of resource consumed 1.3. Analyse resource flow through different parts of the process
2. Develop resource conservation plans	2.1. Determine the efficiency of use/conversion of resources 2.2. Determine causes of low efficiency of use

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Develop plans for increasing the efficiency of resource use 2.4. Check resource use plans comply with regulations/licensing requirements 2.5. Determine benefit/cost of plans
3. Investigate alternative sources of resource	3.1. Determine the function of the resource used 3.2. Develop a specification for function 3.3. Identify a range of sources for meeting that function 3.4. Determine benefit/cost for alternative resource sources
4. Develop plans for more efficient resource use	4.1. Compare benefit/costs for different alternatives developed 4.2. Rank proposals based on benefit/cost compare to limited resources 4.3. Check proposals meet regulatory requirements 4.4. Recommend proposals for improving resource efficiency
5. Implement selected plans	5.1. Liaise with relevant people to implement resource efficiency plans 5.2. Follow through to ensure implementation occurs 5.3. Monitor implementation and make adjustments as required 5.4. Check new resource usage to ensure improvements have occurred

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • mathematics • communication • problem solving • data gathering.

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REQUIRED SKILLS AND KNOWLEDGE
• planning and organising
Required knowledge
• the '3Rs' - reduce, re-use, recycle • regulatory/licensing requirements • types and sources of resources • methods of analysing resource efficiency for different resources • alternative resources/alternative ways of achieving the same function • principles of resource efficiency • relevant regulatory/legislative requirements • process needs for resources

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to analyse the resource use of any/all part/s of the process and determine if there are more efficient/cheaper ways of achieving the same result.
What are the specific resource requirements for this unit?	Access to an organisation seeking to improve its resource usage.
In what context should assessment occur?	Assessment needs to be conducted in an organisation where resource use is a significant cost component.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit is related to: • *MSACMT271A Use sustainable environmental practices* - which covers the individual application level, **and** • *MSACMT670A Develop and manage sustainable energy practices* - which covers energy specific aspects.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable,

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	authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	If evidence is from a major project to improve resource efficiency, then it may provide sufficient evidence. If evidence is from a number of minor improvements to resource use then a range of such improvements will be needed to provide sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Resources	Resources includes all raw materials and components as well as cooling water, process water, cleaning water, fuels, lubricants and other materials used in/required by the process.
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays

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RANGE STATEMENT	
	• movement and transport • poor process design • inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Necessary waste	Necessary waste is any activity or cost which does not contribute directly to customer benefit/feature in the product, and which **cannot** be avoided (e.g. regulatory compliance and fixed costs). Necessary waste cannot be eliminated but should be managed.
Unnecessary waste	Unnecessary waste is any activity or cost which does not contribute directly to customer benefit/features in the product and **can** be avoided. Unnecessary waste should be eliminated as quickly as practical.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT670A Develop and manage sustainable energy practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills needed to identify opportunities for and make improvements in sustainable energy practices in production, maintenance and logistics. Areas covered include efficient use of raw materials, management of waste, electricity conservation, heat conservation and management, water management, environment protection and environment obligations of enterprises.

Application of the Unit

Application of the unit	This is the highest level sustainable energy unit in the CM. In a typical scenario, there is a need to reduce ***waste*** in the ***value chain***. Part of this is the cost of energy to the process. Some of this is ***necessary waste*** but typically a large part of energy use in ***unnecessary waste*** and so should be totally eliminated. In order to make these savings, there is a need to analyse energy use and cost in all its forms and then develop and implement plans for the more efficient use of energy. This unit primarily requires the application of communication and problem solving skills associated with collecting and analysing information. An ability to analyse energy use of technology or processes will be applied. Initiative and enterprise, and planning and organising are also required to develop plans for efficient energy use. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into the development of processes.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse energy use	1.1. Identify all energy consuming processes 1.2. Determine quantity and nature of energy consumed 1.3. Analyse energy consumed and generated in different parts of the process 1.4. Determine source of energy consumed in process 1.5.
2. Develop energy conservation plans	2.1. Determine the efficiency of use of energy by all energy consuming processes 2.2. Determine causes of low efficiency of use 2.3. Develop plans for increasing the efficiency of

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ELEMENT	PERFORMANCE CRITERIA
	energy use 2.4. Determine benefit/cost of plans
3. Develop energy trading plans	3.1. Compare energy generating activities with energy consuming activities 3.2. Determine feasibility of energy consuming activities using energy generated by other activities 3.3. Develop plans for energy trading 3.4. Determine benefit/cost of plans
4. Investigate alternative sources of energy	4.1. Develop a specification for energy required 4.2. Identify a range of sources for that energy 4.3. Determine benefit/cost for alternative energy sources
5. Develop plans for more efficient energy use	5.1. Compare benefit/costs for different alternatives developed 5.2. Rank proposals based on benefit/cost compare to limited resources 5.3. Check proposals meet regulatory requirements 5.4. Recommend proposals for improving energy efficiency
6. Implement selected plans	6.1. Liaise with relevant people to implement energy efficiency plans 6.2. Follow through to ensure implementation occurs 6.3. Monitor implementation and make adjustments as required 6.4. Check new energy usage to ensure improvements have occurred

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • mathematics • communication

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REQUIRED SKILLS AND KNOWLEDGE
• problem solving • data gathering • planning and organising
Required knowledge
• types and sources of energy • methods of analysing energy efficiency for different types of energy • methods of converting energy values from one form to another • alternative sources of energy • principles of energy efficiency • relevant regulatory/legislative requirements • energy trading schemes and procedures • process needs for energy

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to analyse the energy use of any/all part/s of the process and determine if there are more efficient/cheaper ways of achieving the same result.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of analyses of energy consumed and improvements made should be available.
In what context should assessment occur?	Assessment needs to be conducted in an organisation where energy is a significant cost component or by project, simulation or case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit is related to: • *MSACMT270A Use sustainable energy practices* - which covers the individual application level, and • *MSACMT671A Develop and manage sustainable environmental practices* - which covers general environmental practices.

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EVIDENCE GUIDE	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	If evidence is from a major project to improve energy efficiency, then it may provide sufficient evidence. If evidence is from a number of minor improvements to energy then a range of such improvements will be needed to provide sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production

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RANGE STATEMENT	
	• delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Necessary waste	Necessary waste is any activity or cost which does not contribute directly to customer benefit/feature in the product, and which **cannot** be avoided (eg regulatory compliance and fixed costs). Necessary waste cannot be eliminated but should be managed.
Unnecessary waste	Unnecessary waste is any activity or cost which does not contribute directly to customer benefit/features in the product and **can** be avoided. Unnecessary waste should be eliminated as quickly as practical.
Energy	Energy is used to mean all sources of energy used by the process be it electricity, gas or mobile transport fuel. The uses of the energy will also be potentially wide and include heating and cooling, moving materials (including pumps and conveyors), modifying materials (including cutting, forming, weaving, knitting, reacting, moulding, extruding, mixing), generating pressure/vacuum or providing motive power for equipment and transport.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

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Functional area

Functional Area	

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MSACMT662A Develop a documentation control strategy for a manufacturing enterprise

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop and implement a documentation control strategy for a manufacturing enterprise such as might be needed to comply with ISO9000 or other reasons.

Application of the Unit

Application of the unit	In a typical scenario, a person (who may be a manager, technical specialist or other person) implementing a competitive manufacturing strategy is required to develop and/or improve a system to ensure manufacturing and related supporting documents are controlled in a manner which is appropriate for their use in the organisation. This unit primarily requires the application of problem solving, initiative and enterprise, and planning and organising skills associated with developing effective documentation strategies. This work is done in the context of using computer technology and also requires aspects of self management and learning to ensure improvement of own performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and obtain agreement to document management standards	1.1. Establish an appropriate working group of stakeholders 1.2. Agree on purpose and scope of document management standards including interaction with production, maintenance, logistics, sales and marketing systems 1.3. Identify any relevant external standards and conventions 1.4. Agree on document control, tracking and updating processes 1.5. Document the document management standards and circulate to relevant stakeholders 1.6. Negotiate any variations
2. Determine document style and establish standards and conventions	2.1. Consider potential document style/s 2.2. Agree on document conventions and layout 2.3. Agree on standard symbols, abbreviations and similar 2.4. Produce a style sheet, document model or template as appropriate 2.5. Check document style conforms to document

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ELEMENT	PERFORMANCE CRITERIA
	management standards 2.6. Circulate to relevant stakeholders and negotiate any variations
3. Implement document control strategy	3.1. Develop a document control strategy and procedures including arrangements ongoing review of strategy 3.2. Establish mechanisms to check documents conform to the control strategy 3.3. Arrange for appropriate staff development 3.4. Monitor implementation of document control strategy 3.5. Make improvements to the documentation control strategy as appropriate

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• negotiating
• communication
• team work
• problem solving
• planning and organising
• relevant computer applications which may include:
  • word processing
  • spreadsheets
  • database
  • drawing/CAD/CAM

Required knowledge
• knowledge of documents and documentation control • needs of the organisation and its individuals

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to develop a document control strategy which will meet the needs of the organisation and its people.
What are the specific resource requirements for this unit?	Access to a workplace using or implementing document control strategies is required. No other specific resources are required.
In what context should assessment occur?	Assessment will need to occur in a competitive manufacturing organisation and where the individual is responsible for the document control strategy or by case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for	Evidence should be available from an extended

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EVIDENCE GUIDE	
demonstration of consistent performance?	period of time and may be historic if the person has been in this role for some time.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
External standards and conventions	• External standards include ISO9000, AGPS *Style Manual*, Engineering and other technical standards, drawing standards, organisational style/marketing guides etc. • External standards and conventions also include documentation requirements of suppliers, customers, and regulatory agencies.

Unit Sector(s)

Unit Sector	Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT661A Determine and establish information collection requirements and processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to determine what information is needed to support decision making in a competitive manufacturing environment and then to set about establishing required information collection systems. This would usually be done as part of a team and would require consultation with all key stakeholders.

Application of the Unit

Application of the unit	This unit covers the determination of data needs and collection methods for a manufacturing organisation or specific plant or process. This will typically be done in liaison with a wide range of people, each of whom will have their own specific information requirements. There will need to be balanced and interpreted into a workable set of data to be collected. This unit primarily requires the application of communication and problem solving skills associated with determining information requirements and processes of information collection. Initiative and enterprise, and planning and organising are also required to ensure information targets specific factors. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into the development of processes.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse decision to be made	1.1. Identify person/s to be included in the analysis process 1.2. Determine the consequences of the decision in liaison with relevant people 1.3. Determine the variables which can be controlled 1.4. Determine the variables which cannot be controlled 1.5. Determine the consequences of a change in these variables in liaison with affected person/s
2. Define the factors which cause the variables to change	2.1. Identify factors which are able to be controlled 2.2. Identify factors which are not able to be controlled 2.3. Identify means of measuring these factors, or indicators for the values of these factors 2.4. Compile a list of measurements/indicators required. 2.5. Communicate with team members and involve

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ELEMENT	PERFORMANCE CRITERIA
	them in development of factors and changes to ensure awareness and facilitate learning
3. Develop data collection protocols	3.1. Determine methods of making measurements 3.2. Determine methods of quantifying indicators 3.3. Determine the benefit/cost of automated (or other) collection of this data
4. Develop systems to produce required information	4.1. Identify user of information and their needs and abilities 4.2. Determine data processing needs to produce required information 4.3. Determine information distribution channels 4.4. Determine skill development need for recipients of information 4.5. Implement systems to produce information 4.6. Monitor implementation and make adjustments as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication • analysis • problem solving • negotiation • mathematics • teamwork • planning and organising
Required knowledge
• business needs of the organisation/section • information needs of individuals within the organisation • possible data available/potentially available to the organisation • relationship between data available and information required • methods of converting data into useful information

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to determine information and data requirements for any activity, and, in liaison with others, implement the collection of the data and distribution of the information.
What are the specific resource requirements for this unit?	Access to an organisation which makes conscious decisions about its information needs.
In what context should assessment occur?	Assessment will need to occur in an organisation which makes conscious decisions about its information needs.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	There are no related units. Concurrent assessment may be undertaken with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Where evidence is provided from ongoing changes to the information requirements, then a range of changes will be needed to provide sufficient evidence. Where evidence is provided from a complex information requirements project, then a single project may provide sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Determining data needs	This unit is focused more on those decisions which are non-routine and so need specific collection of data, or for those decisions which are routine, the establishment of a routine data collection protocol to allow for the decisions to be made based on appropriate, reliable data.
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems.

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RANGE STATEMENT	
	Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Decision	This unit potentially applies to all organisations that are pursuing competitive manufacturing. A decision can be a change, improvement, new/altered process or system which requires data in order to monitor it or where data is required to make a decision regarding the selection of alternatives.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT660A Develop the application of enterprise systems in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to continuously modify and improve or develop new enterprise wide systems such as SCADA, ERP, MRPII and similar. Typically the development of such a system will be in liaison with an appropriate technical expert who may be an internal expert or an external consultant.

Application of the Unit

Application of the unit	This unit covers the development and implementation of new systems or modifications/changes to the current system. While the person might generate the ideas for change themselves and also undertake a significant part of the final implementation, they would be working closely with an appropriate technical expert (such as the software system supplier) who may actually make the modifications. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising skills are required to determine and implement effective enterprise systems and modifications. This unit also requires computer skills and aspects of self management and learning to ensure feedback and new learning is integrated into system planning.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Monitor information and control needs of organisation	1.1. Check the use of current information 1.2. Check the operation of current control systems 1.3. Communicate regularly with key information users regarding improved/changed information/control needs 1.4. Identify short comings in information/control provision 1.5. Take appropriate action on information/control needs to meet organisational needs
2. Check the current system against organisation needs	2.1. Check the routine use of the system 2.2. Communicate regularly with key stakeholders about current system use and application

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ELEMENT	PERFORMANCE CRITERIA
	2.3. Identify problems/issues 2.4. Take appropriate action on problems/issues
3. Determine developments needed in a new or significantly modified system	3.1. Identify needs requiring a new system or development of modifications to the current system 3.2. Draft scope, specifications and outcomes required 3.3. Liaise with key stakeholders and relevant technical experts to refine scope, specifications and outcomes needed in new or modified system 3.4. Agree final scope, specifications and outcomes
4. Develop system	4.1. Develop project plan 4.2. Ensure ongoing consultation with all relevant stakeholders 4.3. Manage development project 4.4. Manage trialling of modified system 4.5. Ensure modified system meets organisational requirements
5. Implement modified system	5.1. Liaise with all affected personnel 5.2. Develop and agree an implementation strategy 5.3. Ensure all personnel have required skills 5.4. Implement modified system 5.5. Monitor implementation and modify as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• keyboarding/mousing • communication • teamwork • problem solving • negotiation • prioritising • planning

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REQUIRED SKILLS AND KNOWLEDGE
• analysing • organisation
Required knowledge
• capability of resource planning/SCADA systems as appropriate • information and control needs of organisation/process • project management • support/training/skill development mechanisms available for access by personnel

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to modify an existing system to accommodate changed needs of the organisation, or make improvements to an existing system to better do what it is already doing. They could also work with relevant experts to implement a new system to an organisation, process or part of a process.
What are the specific resource requirements for this unit?	Access to an organisation operating systems and undertaking developments to its system.
In what context should assessment occur?	Assessment would need to occur in an organisation using or introducing SCADA, resource planning or similar systems or a suitable simulation.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with units of project management, product design or process improvement/ optimisation.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid,

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EVIDENCE GUIDE	
	reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Where evidence is provide from small developments, a range of development activities should be considered to provide sufficient evidence. Where evidence is from one complex development project, this may provide sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
SCADA	System Control and Data Acquisition (SCADA) is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action. In the continuous manufacturing sector, the SCADA system is sometimes integrated into other sophisticated computer control systems such as Distributed Control System (DCS) and indeed these systems do merge in advanced systems. These organisations may simply refer

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RANGE STATEMENT	
	to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system).
Resource planning	Planning software is a general term applied to a number of software systems which integrate a range of business information such as finance, logistics maintenance and production. It is frequently referred to by names such as ERP, SAP, MRP/MRPII.
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT650A Determine and improve process capability

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to determine the actual (as distinct from design) capability of a process and then to analyse that process to remove assignable causes and reduce random causes. This would typically be done by a manager or technical expert support person either working in a team, or in close liaison with key stakeholders. Process capability is typically calculated using standard deviations.

Application of the Unit

Application of the unit	In a typical scenario a person (who may be a production manager, plant/process engineer, technical specialist or similar) will be responsible for developing plans to improve process capability and following agreement the implementation of the plans to improve process capability. The organisation may use either a ***6 sigma*** or ***3 sigma*** process. This unit primarily requires the application of skills associated with communication in gathering and analysing data and consulting with relevant personnel. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to determine causes to variations and implement solutions. This is done in an environment using computer technology and also requires aspects of self management and learning to ensure feedback and new learning is integrated into process improvements.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT452A*	*Apply statistics to processes in manufacturing*

Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Obtain data for process capability study	1.1. Identify the process requiring capability analysis 1.2. Obtain process capability data
2. Analyse data	2.1. Identify assignable causes of variation in liaison with relevant personnel 2.2. Develop solutions to eliminate variation due to assignable causes in liaison with relevant people 2.3. Analyse random variations for possible causes in liaison with relevant people 2.4. Confirm cause/s of random variation 2.5. Develop solutions to reduce random variations in liaison with relevant people

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ELEMENT	PERFORMANCE CRITERIA
3. Take action to improve process capability	3.1. Develop plans to implement solutions 3.2. Liaise with relevant people to implement solutions 3.3. Gain necessary approvals as required 3.4. Monitor implementation and make adjustments as required 3.5. Determine new/revised process capability 3.6. Implement revised process capability regime

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• mathematical • statistical methods • communication • negotiation • planning • analysis • problem solving • teamwork • computer operation
Required knowledge
• data collection methods • data processing techniques required • variability and normal distribution • three sigma or six sigma processes as relevant • random and non-random results - recognition of assignable causes • causes of different types of non-random results • causes of random variation • process understanding sufficient to translate the data into variations in the process and determine methods of controlling them

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person should be able to implement and review a process capability system and make improvements to the process using process capability as a tool.
What are the specific resource requirements for this unit?	Access to an organisation using process capability.
In what context should assessment occur?	Assessment needs to occur in an organisation using process capability as a tool for process monitoring and improvement. It may also be assessed using a suitable project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit is related to: • *MSACMT250A Monitor process capability*, and • *MSACMT450A Undertake process capability improvements* which cover the lowest and intermediate skill levels in CM respectively.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required	One complex project, or several simpler projects will be

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EVIDENCE GUIDE	
for demonstration of consistent performance?	needed to gain sufficient evidence.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Six sigma	Six sigma is a statistical tool for recording defects and determining capability which equates to only 3.4 defects per million opportunities for each product or service transaction. Six sigma is also used as a general term covering a competitive manufacturing approach. Six sigma training typically covers several units of competency in this Training Package.
Three sigma	Traditional statistical process control uses three sigma limits which equates to 3 defects per thousand opportunities for each product or service transaction.
Procedures	Procedures includes all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

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Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT641A Implement a continuous improvement system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to introduce and institutionalise continuous improvement (kaizen) to the organisation.

Application of the Unit

Application of the unit	This unit covers the introduction of continuous improvement as a manufacturing strategy across an enterprise. Continuous improvement strategies are sometimes also known as kaizen in different manufacturing systems. The continuous improvement (kaizen) strategy is usually undertaken through special improvement 'events' that cover the identification of improvement opportunities and the undertaking of the improvement in a single exercise. This unit primarily requires the application of skills associated with teamwork, problem solving, initiative and enterprise, and planning and organising skills in order to identify, implement and institutionalise kaizen activity. Communication skills are required to gather information and consult with team members and other stakeholders. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into continual improvement. Depending on starting point for the continuous improvement program in the enterprise other relevant units may need to be selected including: • *MSACMT640A Manage 5S system in a manufacturing environment* • *MSACMC611A Manage people relationships* • *MSAPMSUP390A Use structured problem solving*

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	tools • *MSACMT280A Undertake root cause analysis*

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for continuous improvement (kaizen) event	1.1. Select process/area for kaizen event 1.2. Select kaizen team for event 1.3. Develop ***scope*** and direction for event 1.4. Validate scope with stakeholders 1.5. Determine ***whether to proceed*** with kaizen event 1.6. Negotiate problem issues with undertaking identified improvement, or choose a different process or area for improvement activity

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ELEMENT	PERFORMANCE CRITERIA
	1.7. Make infra structure and support arrangements for improvement event.
2. Undertake kaizen event	2.1. Arrange for initial training in continuous improvement (kaizen) and related skills for employees involved in improvement event 2.2. Facilitate the development of operating protocols for the team 2.3. Build a ***description of the target work process*** 2.4. Clarify points of disagreement/uncertainty through consultation and where required by reference to ***procedures*** or other relevant ***authority*** 2.5. Analyse the process to quantify ***waste*** volumes and sources 2.6. Consult individual operators in process or area asking for improvement ideas 2.7. **Solve performance issues** 2.8. Negotiate any differences between problems and proposed solutions and initial objectives of improvement event 2.9. Develop plan(s) and obtain agreements to implement improvements 2.10. Implement improvements 2.11. Measure changes and calculate benefits 2.12. Complete all relevant documentation 2.13. Communicate achievements to stakeholders
3. Institutionalise continuous improvement	3.1. Arrange for additional continuous improvement (kaizen) events using different team members 3.2. Arrange for ongoing continuous improvement (kaizen) events with previous kaizen team members 3.3. Build a culture for ongoing continuous improvement (kaizen)

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • problem solving • teamwork • planning and organising • communication • documenting
Required knowledge
• continuous improvement (kaizen) philosophy and process

Evidence Guide

EVIDENCE GUIDE	
The evidence guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. it is essential for assessment and must be read in conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant training package	
Overview of assessment requirements	Assessment should cover the ability to implement a continuous improvement (kaizen) strategy across a manufacturing enterprise as distinct from simply participating in kaizen events
What are the specific resource requirements for this unit?	Access to an organisation using or introducing kaizen.
In what context should assessment occur?	Assessment will need to occur in an organisation implementing a continuous improvement strategy (kaizen). Assessment should cover a sufficient period to observe the success of the continuous improvement strategy. Assessment may be by project or portfolio assessment.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	Depending on starting point for the continuous improvement program in the enterprise other relevant units that could be assessed in conjunction with this unit include: • *MSACMT640A Manage 5S system in a*

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EVIDENCE GUIDE	
	manufacturing environment • *MSACMC611A Manage people relationships* • *MSAPMSUP390A Use structured problem solving tools* • *MSACMT280A Undertake root cause analysis*
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Generally one significant kaizen event or a number of routine events, plus ongoing kaizen would be needed to generate sufficient evidence.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Scope	Scope of event may include:

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RANGE STATEMENT	
	• description of the business • the target work process • what the key stakeholders seek from the kaizen event • a mission for the event • a set of goals • a statement of the do's and don'ts for the kaizen team
Whether to proceed	The decision to proceed (or otherwise) will be based on: • the focus of the kaizen event makes sense • the business case for doing the event is reasonable • the degree of support from management and employees • the setting and resources available to the event are adequate • the timing of the event will not interfere with business • specifics about the work process such as its overall operating cost and factor costs (eg labour, machine, raw materials) are available
Description of the target work process	The description of the work target process may include: • an overview that captures the purpose of the work process • essentials about the process (eg inputs, outputs, departments with which it coordinates) • a work process map that shows the sequence of operations that execute it
Procedures	Procedures includes all work instructions, standard operating procedures, formulas/ recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations. Procedures also include required procedures under legislation or regulation. awards and enterprise agreements.

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RANGE STATEMENT	
Authority	The authority will vary according to the problem encountered and may include: • internal or external technical specialist • designated manager • equipment supplier • regulatory authority • safety specialist • reference manuals
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Solve performance issues	Solving performance issues includes: • generating improvement ideas (brainstorming/ask expert) • selecting most appropriate improvement ideas to proceed with • conducting experiments where required to test idea • making final selection of improvement ideas

Unit Sector(s)

Unit Sector	CM Tools

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT640A Manage 5S system in a manufacturing environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers knowledge and skills needed for the overall management of the 5S system in a manufacturing organisation.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has decided to pursue ***competitive manufacturing*** and to adopt 5S as one of the tools. This unit covers the skills needed for ensuring the smooth operation and continuous improvement of the 5S system in plant or enterprise. This may be for an initial introduction of, or for the ongoing implementation and continuous improvement resulting from, 5S. This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to ensure a 5S system in implemented in a competitive manufacturing environment. This unit also requires communication and teamwork skills to gather information about processes and implement the 5S system.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	
1. Organise an appropriate environment for 5S	1.1. Arrange for team leaders to develop/maintain skills required for 5S 1.2. Ensure team leaders are developing/maintaining skills required in their team members 1.3. Ensure ***procedures*** and work practices reflect 5S needs and regulatory requirements 1.4. Practise 5S in own work 1.5. Eliminate ***roadblocks*** to 5S
2. Audit 5S implementation	2.1. Undertake spot checks of compliance 2.2. Review workplace for indicators of compliance/non-compliance 2.3. Encourage operators to routinely suggest areas for improvement 2.4. Discuss 5S routinely with team leaders to seek ideas for improvement and encourage identification of non-conformance

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ELEMENT	
3. Improve 5S	3.1. Negotiate solutions to non-conformances 3.2. Implement agreed solutions 3.3. Work with team leaders to develop opportunities for improvements 3.4. Provide necessary resources for improvements 3.5. Ensure procedures and practices change to reflect improvements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication
- planning
- organising
- prioritising
- reading and interpretation
- recording
- problem solving
- teamwork
- negotiation

Required knowledge

- meaning and application of 5S to their job
- principles of efficient workplace organisation
- purposes of 5S
- procedures relevant to jobs
- relevant regulatory requirements
- identification of skill gaps
- methods of addressing skill gaps
- ways of encouraging team leaders and operators to find and suggest areas for improvement
- methods of making/recommending improvements
- methods of accessing required resources
- non-conformance, what they are, assessment of severity and action to be taken

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	There should be evidence of successful application of 5S in the individual's area of responsibility and their positive interaction with it.
What are the specific resource requirements for this unit?	Access to a workplace implementing or practising 5S. No other specific resources are required.
In what context should assessment occur?	Assessment needs to occur in a workplace practising or implementing 5S.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units relating to the person's interactions with their team This unit differs from *MSACMT440A Lead 5S in a manufacturing environment* which covers the intermediate skill levels in CM.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of	5S needs to be a routine, natural part of everyone's job. As such there should be evidence of consistent application of 5S

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EVIDENCE GUIDE	
consistent performance?	over an extended period.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	***Competitive manufacturing*** is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be

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RANGE STATEMENT	
	written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
Roadblocks	Includes all factors which are inhibiting the smooth implementation of 5S.
5S	5S is a system of work organisation originally developed in Japan based around housekeeping principles. A close translation of the five stages in the housekeeping approach is: • sort • set in order • shine • standardise • sustain.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT632A Analyse cost implications of maintenance strategy

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to analyse the cost implications of different maintenance strategies and to adjust adopt the strategy to minimise or eliminate unnecessary costs.

Application of the Unit

Application of the unit	In a typical scenario, an organisation is selecting or reviewing its proactive maintenance strategy. While technical factors are significant in the choice of maintenance strategy and tools, cost factors will also impact on the selection of a maintenance strategy. This unit covers the cost analysis of maintenance strategies and complements the technical analysis covered in *MSACMT681A Develop a proactive maintenance strategy*. The technical analysis may be performed by the same or a different person to the person undertaking the cost analysis. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying costing information and consulting with maintenance personnel. Problem solving, initiative and enterprise, and planning and organising are required to analyse and estimate the cost of maintenance strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse cost components of maintenance	1.1. Determine cost of failure of plant/equipment 1.2. Determine cost of a planned shut down, maintain, start up activity 1.3. Determine cost of maintenance activity for a planned activity 1.4. Determine cost of maintenance activity for an unplanned activity 1.5. Determine costs of condition monitoring 1.6. Identify cost implications for maintenance strategy
2. Estimate life cycle costs of plant/ equipment	2.1. Determine initial capital cost 2.2. Estimate servicing, maintenance and repair costs 2.3. Estimate production and other costs associated with service, maintenance and repair 2.4. Determine depreciation and other applicable allowances 2.5. Estimate ancillary costs such as training,

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ELEMENT	PERFORMANCE CRITERIA
	commissioning, productivity loss 2.6. Estimate technological life and costs of changing to current technology/costs of retaining obsolete equipment 2.7. Estimate annualised costs in present value terms. 2.8. Identify life cycle cost implications for strategy.
3. Liaise with proactive maintenance strategy developer	3.1. Identify cost implications for different strategies 3.2. Negotiate a strategy which minimises total costs 3.3. Monitor the implementation of the strategy to ensure the costs are minimised 3.4. Make required adjustments

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• calculation • analysis • problem solving
Required knowledge
• cost components of maintenance • interrelationship of cost components and maintenance activities

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. it is essential for assessment and must be read in conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant training package	
Overview of assessment requirements	The person will analyse and determine cost components for maintenance strategies. The

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EVIDENCE GUIDE	
	strategies implemented will be cost effective.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies. No other specific resources are required.
In what context should assessment occur?	Assessment will need to occur in a workplace.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence from a single optimisation may be adequate, although generally analyses of a few products with different cost structures or customer benefit structures would be required.

Range Statement

RANGE STATEMENT

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RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Maintenance strategies and techniques may include:	• Total Productive Maintenance (TPM) • Reliability Centred Maintenance (RCM) • Root Cause Analysis (RCA) • Mean Time Between Failures (MBTF) • Failure Mode and Effects Analysis (FMEA) • Condition monitoring ***Total Preventative Maintenance***/***Total Productive Maintenance*** (***TPM***) is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing ***OEE***. ***Reliability Centred Maintenance*** (***RCM***) moves maintenance from reactive, or even planned/programmed towards a focus on ***uptime*** and ***OEE*** ***RCA*** There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However elimination of the ***root cause*** will eliminate the problem. There should only be one ***root cause*** for any problem and so the analysis should continue until this one cause is found. Elimination of the ***root cause*** permanently eliminates the problem. ***Uptime*** refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%. ***Overall equipment efficiency*** (***OEE***) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling

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RANGE STATEMENT	
	• quality rate takes into account losses due to rejects, re-works and start up waste. ***Mean time between failure*** (***MBTF***) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether ***root causes*** are being found and resolved. If ***MBTF*** is reducing, then it is an indicator that the maintenance regime is failing. ***Failure Mode and Effects Analysis*** (***FMEA***) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. ***FMEA*** is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of ***FMEA*** and may practice traditional ***FMEA*** in say their routine maintenance while using another technique (such as ***HAZOP***) for design and modification. ***Hazard and Operability Studies*** (***HAZOP***) is a form of ***FMEA*** which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability. ***Condition monitoring*** involves often quite sophisticated monitoring of equipment including such things as vibration monitoring, instrumental analysis of lubricating oil etc to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.

Unit Sector(s)

Unit Sector	CM Tools

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT631A Undertake value analysis of product costs in terms of customer requirements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by an employee who is required to analyse products and processes to determine the factors that most impact on meeting customer requirements. The analysis is in terms of cost factors and include options for improving cost efficiency. The unit also includes implementing identified changes that increase cost efficiency. The unit may be applied individually or in a team environment. In this unit an employee uses an analysis of the benefits/features which a customer perceives to be in a product/products as a basis for determining waste and so reducing waste.

Application of the Unit

Application of the unit	In a typical scenario, an employee will choose a product, analyse the features/benefits obtained by customers from this product and the cost components relating to those benefits. From this waste will be determined and actions taken to reduce waste. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information. Problem solving, initiative and enterprise, and planning and organising are required to determine cost efficiencies. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into costing methods.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT230A*	*Apply cost factors to work practices*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse customer benefits and determine waste	1.1. Determine features/benefits perceived by customer in product 1.2. Analyse cost components and determine those which deliver customer features/benefits and those which don't 1.3. Analyse waste cost components 1.4. Determine alternative ways of reducing waste costs 1.5. Select actions which maximise customer benefits and minimise costs
2. Analyse production performance variance	2.1. Analyse required performance to meet customer ***pull***

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ELEMENT	PERFORMANCE CRITERIA
	2.2. Determine actual ***cycle time***/s and variability of cycle time 2.3. Analyse cause of waste in throughput 2.4. Analyse costs and determine methods of reducing costs/waste 2.5. Take actions required to achieve cost/waste reduction/s

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• calculation • communication • problem solving • analysis • numeracy • literacy • planning and organising
Required knowledge
• customer benefits from products • performance and cycle times for products made • major costs which are controllable (and how to control them) • types of waste (muda) • methods of reducing waste (muda) • methods of reducing cycle time • desirability of improving performance and methods of reducing cycle time

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge,

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EVIDENCE GUIDE the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The employee will select a product/range of products to analyse and determine waste in terms of any cost which does not contribute directly to an identified customer benefit/feature and then proceed to determine and implement methods of reducing this waste.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies. No other specific resources are required.
In what context should assessment occur?	Assessment will need to occur in a workplace.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units on continuous improvement/kaizen.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be available from a number of minor changes or from a single large change which had multiple facets and which was implemented over a period of months.

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Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Performance	Performance may be thought of as the rate of output of the plant compared to the rate required to meet demand.
Cycle time	Cycle time is the normal time to complete an operation on a product.
Pull	Pull is the concept of producing to demand, rather than for stock or some forecast.

Unit Sector(s)

Unit Sector	CM Tools

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT621A Develop a Just in Time (JIT) system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills needed to plan and implement a Just in Time (JIT) production system in manufacturing. It covers both the initial JIT implementation and also the ongoing improvement and implementation of the improved system.

Application of the Unit

Application of the unit	In a typical scenario, an organisation decides to adopt JIT and so needs to plan and develop their JIT system. This unit covers the skills needed to both plan the implementation of JIT and also consult with employees, suppliers and customers regarding the change. This may require identification of training and other employee support as well as identifying possible logistical support. It includes ***kanban*** based JIT systems but uses JIT principles so that it is applicable to process manufacturing and other sectors and systems that are not suitable for a kanban type JIT implementation. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to determine an effective JIT system for the enterprise. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into the JIT design. This unit could be assessed concurrently with: • *MSACMS601A Analyse and map a value chain*, and/or

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	• *MSACMT650A Determine and improve process capability*. This unit is related to: • *MSACMT221A Apply Just in Time*(*JIT*) *procedures*, and • *MSACMT421A Facilitate a Just in Time* (*JIT*) *system* which cover the lowest and intermediate skill levels in CM respectively.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMC410A*	*Lead change in a manufacturing environment*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA
1. Design the JIT system/system improvements	1.1. Identify ***value chain*** members 1.2. Consult with internal and external value chain members 1.3. Identify current storage/inventory in value chain 1.4. Determine flow authorisation indicators 1.5. Determine minimum and maximum production rate capability 1.6. Determine production lead time for products subject to JIT 1.7. Determine number of ***cards***/***bins*** and number of units per card/bin 1.8. Draft workable procedures to implement JIT
2. Implement the JIT system/improvements	2.1. Consult with key internal stakeholders to develop solutions to JIT issues 2.2. Ensure all stakeholders have required JIT related skills and related issues have been resolved 2.3. Liaise with key external members of the value chain to develop solutions to JIT issues 2.4. Develop implementation plan for JIT 2.5. Determine ***key measures*** of JIT
3. Monitor the JIT system	3.1. Monitor key measures of JIT 3.2. Regularly liaise with key stakeholders seeking areas for improvement 3.3. Identify areas in need of improvement

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• reading • recording • communicating • planning • analysing • problem solving

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REQUIRED SKILLS AND KNOWLEDGE
• negotiating
Required knowledge
• needs of value chain members • principles of JIT • reasons for delays/storages/inventories in the value chain and methods of reducing/eliminating them • methods of identifying skill gaps and methods of filling skill gaps • key business objectives associated with implementing JIT • principles of the manufacturing process relevant to the section/team • production data generated by the process and its application to JIT

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to plan the initial introduction of JIT to an organisation or a process, or plan improvements to an existing JIT system.
What are the specific resource requirements for this unit?	Access to an organisation using JIT.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of the design, implementation and monitoring of a JIT system and the effective operation of the JIT system are required.
In what context should assessment occur?	Assessment needs to occur in an organisation using JIT or by use of a suitable project or case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with: • *MSACMS601A Analyse and map a value chain*, **and**/**or** • *MSACMT650A Determine and improve process capability*. This unit is related to: • *MSACMT221A Apply Just in Time*(*JIT*) *procedures*, **and**

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EVIDENCE GUIDE	
	• *MSACMT421A Facilitate a Just in Time* (*JIT*) *system* which cover the lowest and intermediate skill levels in CM respectively.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Where evidence is gathered from the initial introduction of JIT to an organisation or a process, then this single project may generate sufficient evidence. Where evidence is gathered from continuous improvements to an existing JIT system, then it will be required from a range of improvements to generate sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Just In Time (**JIT**)	Just In Time (JIT) is a production scheduling concept that calls for any item needed at a production operation,

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RANGE STATEMENT	
	whether raw material, finished item, or anything in between, to be produced and available precisely when needed, neither a moment earlier nor a moment later.
Kanban	Kanban - a card or sheet used to authorise production or movement of an item; when fully implemented, kanban (the plural is the same as the singular) operates according to the following rules: • all production and movement of parts and material take place only as required by a downstream operation, i.e. all manufacturing and procurement are ultimately driven by the requirements of final assembly or the equivalent • the specific tool which authorises production or movement is called a kanban. The word literally means card or sign, but it can legitimately refer to a container or other authorizing device. Kanban have various formats and content as appropriate for their usage (eg a kanban for a vendor is different than a kanban for an internal machining operation). Kanban is typically applied to batch type operation and the production is measured in units produced. In continuous manufacturing organisations, production is measured in terms of production rate (eg kg/h, tonne/day) and rate is increased/decreased according to the flow authorisation which may be a kanban (eg ticket, order from a supplier) or may be a ***SCADA*** signal from a remote facility (eg customer tank) saying that resupply is required or similar.
SCADA	System Control and Data Acquisition (SCADA) is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action.
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of

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RANGE STATEMENT	
	competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Flow authorisation indicator	Flow authorisation indicator may be kanban bin, ticket or similar, or may be some other indicator of demand pull.
Pull system	Pull system - a manufacturing planning system which makes to demand, rather than for stock or to a forecast.
Cards/bins	The indicators used for production authorisation and may be physical cards or bins or some other suitable indicator.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
Key measures	Key measures may include inventory levels, lead time, IFOTIS delivery, productivity/production rate, other measures of pull through the value chain, quality. IFOTIS refers to delivery of product In Full, On Time and In Specification.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

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Functional area

Functional Area	

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MSACMT620A Develop quick changeover procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop/improve changeovers.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has adopted/is adopting a ***quick changeover*** approach to its changeovers to equipment required for production. This unit applies to the structured development and/or improvement of changeover ***procedures***. To do this they will ***critically analyse*** the existing changeovers and by applying quick changeover principles, develop improved changeover procedures. This unit requires the application of skills associated with communication, problem solving, initiative, enterprise, planning and organising in order to analyse and determine changeover procedures. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into the development of procedures.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse changeover	1.1. Critically observe changeover process 1.2. Identify steps in changeover 1.3. Identify start situation and required finish situation for changeover
2. Apply quick changeover principles	2.1. Identify changes to the start situation and required finish situation which are possible 2.2. Identify internal and external changeover activities 2.3. Identify activities which could be ***improved***/***eliminated*** 2.4. Eliminate/reduce adjustments required after changeover 2.5. Develop improved changeover process and recommendations for implementation procedure 2.6. Liaise with relevant people to validate recommendations
3. Design in good occupational health and safety (OHS)	3.1. Analyse hazards and risks from all steps in changeover 3.2. Apply ergonomic principles and hierarchy of control to each hazard

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Minimise hazards during changeover ensuring final risk profile is ***acceptable***
4. Implement improved changeover	4.1. Acquire any required resources and approvals 4.2. Organise trials of improved changeover 4.3. Monitor trial 4.4. Make adjustments to changeover process 4.5. Implement improved changeover process

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- ability to break changeover down into key steps
- communication
- teamwork
- negotiation
- problem solving
- planning and organising

Required knowledge

- principles of quick changeover
- safe movement and other relevant OHS principles
- relevant procedures
- purposes/requirements of changeover
- sourcing of resources
- trialling procedures
- ability to differentiate between habitual practice and necessary activity

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge,

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EVIDENCE GUIDE the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to critically examine existing changeover procedures and develop and implement improved procedures which will steadily move the organisation to greater uptime/lower changeover caused downtime.
What are the specific resource requirements for this unit?	Access to an organisation using quick changeover.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of changeover procedures modified and improved in accordance with the above criteria should be available.
In what context should assessment occur?	Assessment will need to occur in an organisation following quick changeover or by a suitable project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other improvement units. This unit is related to: • *MSACMT220A Apply quick changeover procedures* which covers the doing quick changeovers.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Where evidence is from a continuous improvement to changeover then a range of improvements will be required to generate sufficient evidence. Where evidence is from the initial introduction of quick changeovers or a complex improvement, then the single project may generate sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Changeover	Changeover may refer to an exchange of dies/tools (traditional), or a change between batches, or between campaigns. It may be any quantum equipment/process change to produce a different product. It may sometimes be referred to as ***SMED*** which is an abbreviation for Single Minute Exchange of Die; literally, changing a die on a forming or stamping machine in a minute or less; or broadly the ability to perform any ***set-up activity*** in a minute or less of machine or process downtime. The key to doing this is frequently the capability to convert ***internal set-up time*** to ***external set-up time***; variations on SMED include: Single-digit set-up: performing a set-up activity in a single-digit number of minutes, i.e. fewer than ten. OTED: One touch exchange of die; literally, changing a die with one physical motion such as pushing a button; broadly, an extremely simple procedure for performing a set-up activity. ***Set-up time*** - work required to change over a machine or process from one item or operation to the next item or operation; can be divided into two types: • ***internal set-up*** work that can be done only when the machine or process is not actively engaged in

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RANGE STATEMENT	
	production, or • ***external set-up*** work that can be done concurrently with the machine or process performing production duties. While the term die is the traditional term, competitive manufacturers who require changeovers using other equipment are also covered by this unit. This unit may not be applicable to a totally continuous operation producing only the one product, or simultaneous range of products. This is not applicable to a maintenance/PVI shutdown as experienced by the continuous process manufacturers. However, where there is continuous manufacturing on a campaign basis, it may be applied to the development of changeover procedures between campaigns or similar changeovers.
Critically analyse	Critical analysis of the existing changeover involves a detailed examination to observe all actions and delays and the times taken.
Principles	The principles of quick changeover include the principles of efficient movement as well as an understanding of jigs, fixtures, locating devices and mechanical aids which will reduce human effort and time required.
Improved/eliminated	Activities which should be improved/eliminated include not only those which take time or are unreliable in terms of outcome, but also those which are difficult to do or have adverse OHS implications (eg repetitive strain injury, back injury, finger injuries).
Acceptable	An acceptable risk profile is one which at the minimum meets regulatory and organisation requirements and does not increase the current risk profile.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government

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RANGE STATEMENT	
	regulations.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMS603A Develop manufacturing related business plans

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop business plans in a competitive manufacturing environment.

Application of the Unit

Application of the unit	In a typical scenario, the person (who may be a production/plant manager, purchasing/technical officer or similar) is required to develop a section business plan to meet the requirements of the overall strategic plan of the organisation. The plan includes the impact on the value chain and other critical competitive manufacturing factors. Due competitive pressures in manufacturing, this may be a reasonably frequent activity and can occur at any time over the business cycle. The plan may be in response to a specific change, or it may be a plan for the next period. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to develop effective and measurable business plan. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into competitive manufacturing strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine purpose of plan	1.1. Confirm reason for developing plan and expected outcomes from plan 1.2. Confirm purpose of plan with all relevant stakeholders 1.3. Check expected outcomes from plan with overall strategic plan for organisation 1.4. Identify any potential areas for conflict between proposed plan and strategic directions 1.5. Negotiate with relevant stakeholders to resolve issues
2. Develop objectives and strategies	2.1. Draft ***objectives*** for business plan 2.2. Draft strategies to achieve these objectives 2.3. Determine implications for value chain 2.4. Determine capital or workplace layout/organisation implications for ***objectives and strategies***
3. Develop plans to meet	3.1. Negotiate with ***relevant stakeholders*** over

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ELEMENT	PERFORMANCE CRITERIA
objectives and strategies	implications for objectives and strategies 3.2. In liaison with relevant stakeholders, develop plans to meet objectives 3.3. Determine relevant Key Performance Indicators (KPIs) for plan 3.4. Check Key Performance Indicators (KPIs) are appropriate for purpose of plan 3.5. Check plan will deliver planned purpose 3.6. Map plan to changed value chain 3.7. Adjust plan to optimise value chain 3.8. Validate plan with relevant stakeholders
4. Monitor the implementation of the plan	4.1. Release plan for implementation 4.2. Check the key progress points against the key stages of the plan 4.3. Note any discrepancies 4.4. Take appropriate action to ensure correct implementation of plan

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• planning • communication • negotiating • prioritising • numeracy/calculation • problem solving • organising information
Required knowledge
• knowledge of organisation strategic directions • planning methods and types of plans • contingency planning and other risk mitigating planning tools • the organisation's value chain • analysis of value chain

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REQUIRED SKILLS AND KNOWLEDGE
• competitive manufacturing practices • application of quality principles • human resources and Industrial Relations • OHS

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to develop a plan which successfully delivers plan objectives.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies is required. No other specific resources are required.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of having developed a plan which meets its objectives.
In what context should assessment occur?	Assessment will need to occur in a competitive manufacturing organisation and where the individual is undertaking business planning or by project or case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work,

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EVIDENCE GUIDE	
	samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence from one significant plan should be sufficient, or alternatively from several smaller business plans.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and

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RANGE STATEMENT	
	analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Plan	Plan may include any sort of business plan and may emphasise any of the areas for sub-plans over the others.
Objectives	Objectives may include: • quality • occupational health and safety (OHS) • environment • competitive manufacturing practices • human, physical, financial and environmental/resource.
Objectives and strategies	Objectives and strategies may include: • human and industrial relations • material/component and resources • sustainable environmental practices • sales and marketing • financial.
Relevant stakeholders	Relevant stakeholders may include: • other team members • other workers • management • technical specialists • other members of the value chain.

Unit Sector(s)

Unit Sector	CM Systems

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMS602A Manage a value chain

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to manage a value chain, a supply chain or a demand chain, including the close liaison with suppliers and customers and even the managing of the supply/demand chain of smaller suppliers/customers (if they wish it). This unit covers the managing of the supply chain, the demand chain as well as the overall value chain and may be applied to the managing of the chain internally/externally within an organisation.

Application of the Unit

Application of the unit	In a typical scenario, the person (who may be a manager, technical specialist or similar) needs to manage the value/supply/demand chain on an ongoing basis to achieve the best overall contribution of valued added to their product in terms of customer benefit/features.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMS601A*	*Analyse and map a value chain*
	MSACMT631A	*Undertake value analysis of*

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Prerequisite units	*MSACMS601A*	*Analyse and map a value chain*
		product costs in terms of customer requirements

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluate the value chain	1.1. Identify all members in the value chain for product/s in area of responsibility 1.2. Identify ***value added*** by each member of the chain 1.3. Identify acute and chronic issues which impact on the value chain 1.4. Develop priority list of items for improvement
2. Liaise regularly with chain members	2.1. Establish and maintain regular liaison with all chain members 2.2. Identify current and forecast issues with each member 2.3. Work with members to help them address their issues 2.4. Build trust and confidence in the relationship 2.5. Develop a priority list of items for improvement

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ELEMENT	PERFORMANCE CRITERIA
	2.6. Negotiate with all chain members to ensure improvements benefit chain members and improve the benefits/features perceived by the ultimate customer
3. Monitor the value added at each step	3.1. Identify changes in value added by each chain member 3.2. Identify areas where changes to value added are required 3.3. Develop a priority list of items for improvement 3.4. Work with chain member to bring about improvements to value added
4. Continue to reduce waste	4.1. Identify ***waste*** in value chain 4.2. Work with chain members to continually reduce waste

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• liaison • negotiation • communication • planning • basic value analysis
Required knowledge
• purpose of value chain analysis • methods of value chain analysis • types of waste and methods of reducing it • process used to make product • processes employed by other members of the value chain sufficient to have meaningful dialog with them • methods of value analysis

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be continuously monitoring the value chain to drive further improvement both in their own organisation and also others in the value chain.
What are the specific resource requirements for this unit?	Access to an organisation following competitive manufacturing.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of ongoing improvements in the value chain should be available, along with the waste reductions which flow from it.
In what context should assessment occur?	Assessment needs to occur in an organisation pursuing competitive manufacturing or by a suitable project or case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units related to development and improvements of systems for competitive manufacturing.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the

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EVIDENCE GUIDE	
	assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be from an ongoing monitoring and improvement of the supply chain.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Value chain	Competitive manufacturing organisations encompass the entire supply system, beginning product design, raw material mining and processing and all tiers of the value chain. Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Value added	Value added is measured against its contribution to the customer benefits/features and may be in the form of: • technical benefits/features • location benefits/features • aesthetic benefits/features • information benefits/features.
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design

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RANGE STATEMENT	
	• inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.

Unit Sector(s)

Unit Sector	CM Systems

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMS601A Analyse and map a value chain

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills needed to analyse and map a value chain, including the clear identification of the place of a manufacturing enterprise in the value chain and its contribution to the value chain. The unit will cover the identification of enterprises in a value chain, including their relationships and the activities undertaken by value chain enterprises. The identification skills include identification at the virtual or information level, the technical or process level and at the physical or logistic level. The unit includes the analysis of value adding and non-value adding activities and the information needs for successful value chain mapping, including information technology (IT) needs. This unit covers the analysis of the supply chain, the demand chain as well as the overall value chain.

Application of the Unit

Application of the unit	In a typical scenario, the person (who may be a production/plant manager, purchasing/technical officer or similar) needs to analyse a value chain, a supply chain or a demand chain in order to understand the interactions between all members and determine the value added/potential value added by each member. This is the basis for the design of ***Just in Time*** (***JIT***) and for the determination of ***waste***. Value chain analysis is not just a one off activity but rather an ongoing activity of re-analysis as the value chain changes as its members progress towards truly competitive manufacturing.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT631A*	*Undertake value analysis of product costs in terms of customer requirements*.

Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Map the value stream	1.1. Select a product/product group for analysis 1.2. Identify ultimate customer/s 1.3. Identify ultimate supplier/s 1.4. Identify all organisations between ultimate supplier and ultimate customer 1.5. Identify all steps in own organisation
2. Define customer need	2.1. Determine the features/benefits obtained by customers from product/s

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ELEMENT	PERFORMANCE CRITERIA
	2.2. Determine methods of measuring the contribution to each features/benefits 2.3. Identify possible data sources for required measures 2.4. Implement measurement of contribution to features/benefits
3. Assess the value added at each step	3.1. Identify value contributed by each external organisation 3.2. Determine value added by each internal step 3.3. Determine method of measuring value added
4. Reduce waste	4.1. Compare value added to customer benefit/feature 4.2. Identify activities which do not add to customer benefit/features 4.3. Liaise with external value chain members to determine methods to reduce overall waste 4.4. Take required actions to reduce waste

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • problem solving • communication • calculations • negotiation
Required knowledge
• purpose of value chain analysis • methods of value chain analysis • types of waste and methods of reducing it • process used to make product • processes employed by other members of the value chain sufficient to have meaningful dialog with them

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment requirements	The person will have a current value map and will be continuously updating the analysis of the value chain to drive further improvement both in their own organisation and also others in the value chain.
What are the specific resource requirements for this unit?	Access to an organisation following competitive manufacturing.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of a current analysis of the value chain should be available, along with the waste reductions which flow from it.
In what context should assessment occur?	Assessment needs to occur in an organisation pursuing competitive manufacturing, or by use of a project or case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units related to development and improvements of systems for competitive manufacturing.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed

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EVIDENCE GUIDE	
	with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Where evidence is provided from an initial value chain analysis, then this may provide sufficient evidence. Where evidence is from an ongoing updating of an analysis then evidence is required from a range of analyses/products.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the ***customer***, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Value added	Value added is measured against its contribution to the customer benefits/features and may be in the form of: • technical benefits/features • location benefits/features • aesthetic benefits/features • information benefits/features.
Just in time (**JIT**)	Just in time (JIT) is a production scheduling concept that calls for any item needed at a production operation - whether raw material, finished item, or anything in between, to be produced and available precisely when needed, neither a moment earlier nor a moment later.

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RANGE STATEMENT	
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.

Unit Sector(s)

Unit Sector	CM Systems

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMS600A Develop a competitive manufacturing system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to develop a new competitive manufacturing system or make improvements to an existing system.

Application of the Unit

Application of the unit	In a typical scenario, the person (who may be a manager, technical specialist or similar) in a competitive manufacturing organisation, or an organisation wishing to embark on the competitive manufacturing path, needs to be able to analyse the needs of the organisation and lead them through a change process and down the competitive manufacturing path. This would typically be done in a team, or at least in close liaison with all relevant stakeholders. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to determine effective competitive manufacturing strategies for the enterprise. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into competitive manufacturing strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine appropriate analytical techniques	1.1. Liaise with key stakeholders to determine objectives of manufacturing ***strategy*** 1.2. Examine current manufacturing situation to determine major areas requiring improvement 1.3. Compare possible strategies, ***techniques*** and ***tools*** against organisation needs 1.4. Select possible strategies, techniques and tools 1.5. Consult with key stakeholders to confirm selected strategies, techniques and tools
2. Develop competitive manufacturing strategies	2.1. Estimate benefit/cost ratio for major stakeholders and the ***value chain*** overall 2.2. Select preferred manufacturing strategy 2.3. Examine and adapt strategy to organisation needs and priorities 2.4. Examine and adapt techniques and tools required to implement strategy 2.5. Negotiate with key stakeholders to develop an

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ELEMENT	PERFORMANCE CRITERIA
	implementation plan 2.6. Identify key information and performance indicators required
3. Implement strategy	3.1. Identify data collection required 3.2. Identify methods of collecting and processing required data 3.3. Identify hardware and other resources required 3.4. Identify skill needs required 3.5. Ensure all resources/training are available and completed 3.6. Implement strategy
4. Monitor implementation of strategy	4.1. Compare information/performance indicators with desired levels 4.2. Liaise with key stakeholders regarding strategy issues 4.3. Identify areas requiring adjustment 4.4. Make required adjustments

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication • teamwork • analysis • problem solving • mathematics • planning • computer use • prioritising • recording data
Required knowledge
• overview of competitive manufacturing principles and the decision rules for selecting the appropriate tools to use and place to start

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REQUIRED SKILLS AND KNOWLEDGE
• methods of estimating costs/benefits • acceptable benefit/cost ratios • continuous improvement principles • principles of motivation and leadership • systems thinking • characteristics and strengths of different types of strategies, techniques and tools such as 5S, JIT, 6 sigma, lean manufacturing, agile manufacturing • business goals sufficient to match the strategy to the business needs • strategic thinking • principles of process equipment and how to improve its reliability • resources required and how to obtain them

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	The person will be able to conceptualise scenarios, determine which ones are of sufficient benefit to proceed with, and take their team with them.
What are the specific resource requirements for this unit?	Access to an organisation using competitive manufacturing.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of scenarios developed and implemented (and/or rejected for valid reasons) which have had a positive impact on the entire value chain should be available.
In what context should assessment occur?	Assessment needs to occur in an organisation following competitive manufacturing.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units to do with change in the competitive manufacturing environment. This unit is related to: *MSACMC210A Manage the impact of change on own work* which covers individual impact aspects in CM.

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EVIDENCE GUIDE	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Generally evidence will come from a range of scenarios and the improvements which flow.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA)

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RANGE STATEMENT	
	software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Strategy	There are many approaches used to embarking on competitive manufacturing. Successful organisations select an appropriate array of techniques and tools and formulate a strategy for their implementation.
Techniques and tools	There are many techniques and tools used to implement a competitive manufacturing strategy such as 5S, six sigma, root cause analysis
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the ***customer***, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
System	A competitive manufacturing system is that holistic combination of the process, plant and equipment, procedures and practices including the skills and work organisation of the workforce which make up the productive organisation.

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Unit Sector(s)

Unit Sector	CM Systems

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMC614A Develop a communications strategy to support production

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop and implement a communications strategy to support production in a competitive manufacturing environment.

Application of the Unit

Application of the unit	In a typical scenario, a person (who may be a manager, technical specialist or other person) is required to analyse a situation to determine the required communication strategies from a wide range of possibilities and then implement that strategy or modify an existing strategy. This unit primarily requires the application of skills associated with developing effective communication strategies. Problem solving, initiative and enterprise, and planning and organising are required to ensure communications are targeted and meet the needs of stakeholders. This unit also requires aspects of self management and learning to ensure improvement of own communication effectiveness.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine information needs of employees and manufacturing systems	1.1. Examine ***competitive manufacturing*** strategy and determine broad information framework 1.2. Examine the production process and its requirements and determine the information needs of production employees 1.3. Examine the maintenance strategy and determine the information needed by maintenance employees 1.4. Examine the office, logistics, sales, marketing and other areas supporting production and determine the information needs of employees 1.5. Discuss information used and desired with employees at all relevant levels, and involve team and other key personnel in strategy development to ensure awareness, learning and commitment 1.6. Examine control systems to determine their data needs

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ELEMENT	PERFORMANCE CRITERIA
2. Select communication strategy	2.1. Analyse required information flows 2.2. Determine ***access requirements*** by information users 2.3. Evaluate suitability of ***communication media*** for required information flows and access 2.4. Discuss possible strategy with relevant stakeholders 2.5. Select an appropriate strategy or strategies.
3. Implement strategy	3.1. Develop list of what needs to be done 3.2. Determine resources required to implement strategy 3.3. Obtain authority for communication media to be developed 3.4. Monitor development of communication media and take appropriate corrective action as required 3.5. Deploy developed communication media
4. Monitor ongoing situation	4.1. Determine relevant indicators for communication strategy 4.2. Monitor indicators 4.3. Re-evaluate communication needs on a regular basis 4.4. Make improvements to the communication strategy as appropriate.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• negotiating • communication • team work • problem solving • planning and organising
Required knowledge
• knowledge of communication media

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REQUIRED SKILLS AND KNOWLEDGE
• communication needs of the organisation and its individuals

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment requirements	Assessment should aim to demonstrate that the person being assessed can develop a communication strategy which will meet the information needs of a competitive manufacturing organisation and its employees.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies is required. No other specific resources are required.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of developing/improving a communications strategy.
In what context should assessment occur?	Assessment will need to occur in a competitive manufacturing organisation and where the individual is responsible for the communication strategy or by case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require

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	language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be available from an extended period of time and may be historic if the person has been in this role for some time.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	***Competitive manufacturing*** is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems control and data acquisition software (SCADA), enterprise resource planning systems (ERP), Manufacturing resource planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just In Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis

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RANGE STATEMENT	
	• other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Access requirements	Access requirements include: • occasional access • periodic access • continual access • visual/auditory/tactile access • online/hard copy access • specific location • many or generalised locations
Communication media	Communication media include: • manuals such as SOPs, OHS and training manuals • aide memoir • verbal • signage • instruction displays • tags, isolations/lockouts • permits to work/clearances • operator reporting • visual factory type displays • painted walkways • tools/keys/buttons with a specific feel
Stakeholders	Includes team members, personnel officers, industrial officers, union delegates, production management, human relations management, financial management, engineering/ technical personnel.

Unit Sector(s)

Unit Sector	CM Change/interpersonal

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMC613A Facilitate holistic culture improvement in a manufacturing enterprise

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a manager, to help develop a culture within the organisation appropriate for achieving competitive manufacturing.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has embarked on competitive manufacturing and a manager is seeking to change / improve the organisation culture to be consistent with that required to maximise the benefits from a competitive manufacturing strategy. This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise in order to assess and address culture development needs in the enterprise. Planning and organising is required to ensure a systematic approach to the development of an enterprise culture that supports competitive manufacturing processes.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Facilitate a company wide appreciation for the Competitive Manufacturing strategy	1.1. Communicate with all levels of the organisation the objectives and benefits of a ***Competitive Manufacturing strategy***
	1.2. Communicate to all levels of the organisation the techniques and methods that will be used in achieving the Competitive Manufacturing strategy
	1.3. Facilitate the development of a ***systems approach*** to how the organisation works
	1.4. Demonstrate a constancy of purpose for the organisation in the push for the continual improvement in all activities
	1.5. Break down any communication barriers between parts of the organisation that may inhibit the competitive manufacturing strategy
	1.6. Develop a ***work structure*** that allows for everyone to participate and be heard in the transformation of the organisation

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ELEMENT	PERFORMANCE CRITERIA
2. Facilitate application of knowledge about variation and ways to improve the production process	2.1. Develop the application of a statistical approach by all people to all facets of the production system with a view to reducing variation 2.2. Encourage the approach of building quality in and eliminating the need for mass inspection
3. Facilitate the development of knowledge and skill acquisition.	3.1. Institute training on the job 3.2. Institute a vigorous program of education and self-improvement for all employees 3.3. Involve team members in identification of skill needs and any skills gaps, and in development of a strategy for training, skills acquisition and self-improvement so as to ensure awareness, learning and commitment
4. Facilitate the development of support within the organisation for competitive manufacturing practices	4.1. Ensure sufficient resources and adequate equipment is available to meet the requirements of the competitive manufacturing strategy 4.2. Encourage acceptance of change 4.3. Encourage employee commitment to and responsibility for the quality of their own work 4.4. Provide continuous feed back and communication of progress at all levels in implementing the strategy

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • problem solving • teamwork • communication • documenting • planning and organising
Required knowledge
• Production or technical knowledge appropriate to the enterprise and the employee's

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REQUIRED SKILLS AND KNOWLEDGE
position • Principles of change management • Deming's 14 points • Deming's System of Profound Knowledge • Or equivalent philosophy appropriate to or selected by the organisation

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read in conjunction with the Performance Criteria, the Range Statement and the Assessment Guidelines of the relevant Training Package.

Overview of assessment requirements	The person being assessed should be able to demonstrate the integration of the elements of this unit in a holistic manner and show their application to the organisation.
What are the specific resource requirements for this unit?	Access to an organisation implementing competitive manufacturing.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of the review and understanding of a philosophy of Deming's 14 points (or similar) should be available.
In what context should assessment occur?	Assessment will need to occur in an organisation implementing/wishing to implement competitive manufacturing.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include

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EVIDENCE GUIDE	
	direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
What evidence is required for demonstration of consistent performance?	Evidence of consistent application of the principles and moving down the path should be sufficient evidence rather than evidence of having arrived.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive Manufacturing strategy	Strategies may include one or more of: • Six sigma • Lean Manufacturing • Agile Manufacturing • Just in Time (JIT) • Supply chain management • Value Chain Management • Total Quality • Pro Active maintenance • Elimination of waste • Balanced Scorecard
Systems approach	A systems approach enables persons to see how work

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RANGE STATEMENT	
	gets done and effect of changes and shows the internal/external relationships through which products and services are produced and may include considerations of: • customer • supplier • value chain member • member of the public • other external individual, group or organisation.
Work structures	May include use of teams, self directed, cross functional etc. Structures are appropriate to the job and job steps are in a logical order

Unit Sector(s)

Unit Sector	CM Change/interpersonal

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMC612A Manage workplace learning

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to manage the learning and skill development for a manufacturing workforce.

Application of the Unit

Application of the unit	Management of the identification of skills needed by a work force to undertake the required work including arranging for any required learning processes. The unit does not cover trainer and assessor skills. This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise in order to assess and address skill needs in an individual and in the enterprise. Planning and organising is required to ensure skill development meets the needs of the enterprise and aspects of self management and learning are required to ensure improvement of performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify current skill requirements for the work team	1.1. Ensure records/data base of skill mix currently required by the work team are maintained in accordance with ***procedures*** 1.2. Re-assess and monitor the skills required by the team as enterprise requirements change 1.3. Consult with relevant stakeholders to predict any new/different skill requirements arising from changes to products, processes, equipment or work organisation
2. Determine current skill mix of work team	2.1. Ensure current records/data base of skill profile of individuals within the team are maintained 2.2. Consult with relevant stakeholders and monitor the application of these skills in the workplace to ensure they remain current and valid 2.3. Review the actual skill mix of the team compared to the required skill mix of the team
3. Make arrangements for skill development	3.1. Consult with team and identify any mismatch of skills possessed and used and skills required 3.2. Identify any new skills required due to anticipated changes 3.3. Consult with relevant stakeholders to determine the best way to refresh existing skills/develop new skills

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ELEMENT	PERFORMANCE CRITERIA
	3.4. Develop individual skill development program 3.5. Ensure skill development programs are implemented in accordance with procedures
4. Forecast possible future skill needs	4.1. Examine strategic directions of organisation 4.2. Discuss possible future directions with relevant stakeholders 4.3. Determine possible long term future skill requirements in consultation with relevant stakeholders 4.4. Develop plan to ensure skills are developed in advance of when they are required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication • planning • assessing • analysing • negotiation • problem solving • teamwork
Required knowledge
• knowledge of skill analysis methods or how to access skill analysis from relevant experts • knowledge of skill development methods, or how to access skill development programs from relevant experts • relevant formal qualifications/skill standards available to the team members, and their relevance to the job and the organisation

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment requirements	The person will ensure that at all times the team has all the skills required to complete their work, but not necessarily any more skills.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies is required. No other specific resources are required.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of the work team always having the required skills for the job.
In what context should assessment occur?	Assessment will need to occur in a competitive manufacturing organisation or by case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Evidence should be available from an extended period of time and may be historic if the person has been in this role for some time.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Workplace learning	This unit covers the development and maintenance of skill of the team operating in a Just in Time (JIT) environment. It covers both formally recognised and unrecognised training as well as other skill development programs. It may include job rotation, internal training, external training and self directed training.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations. Procedures may also include industrial relations requirements and any classification changes that result from the acquisition of higher level skills.

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Unit Sector(s)

Unit Sector	CM Change/interpersonal

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMC611A Manage people relationships

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to manage the human relationship aspects of implementing and operating competitive manufacturing systems.

Application of the Unit

Application of the unit	In a typical scenario, a person (who may be a manager, technical specialist or other person) is required to work with people, encourage them to accept change and also to increase the quality, quantity and reliability of output. Much of this is due to good relations with the employees and relevant people. This unit primarily requires on strong communication, teamwork, and problem solving skills to achieve effective relationships that support a competitive manufacturing environment. Initiative and enterprise and planning and organising are also required to ensure relationships are monitored and issues are resolved proactively. This also requires aspects of self management and learning to ensure improvement of own performance and communication skills.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop an open environment	1.1. Establish and maintain regular dialogue between all levels and all relevant sections of the organisation 1.2. Encourage a flow of communications in both directions 1.3. Identify ***key personnel*** for communications 1.4. Develop and maintain a ***formal mechanism*** for the flow of issues, concerns and suggestions in both directions 1.5. Develop and maintain regular and frequent verbal communication with all key stakeholders
2. Identify significant issues	2.1. In liaison with relevant team members/***stakeholders***, identify current and potential issues 2.2. Assist team members/stakeholders to formulate issues 2.3. Identify and define boundary and ' non-negotiable' issues for all team members/stakeholders 2.4. Negotiate with relevant team members/stakeholders over actual and potential

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ELEMENT	PERFORMANCE CRITERIA
	issues
3. Proactively resolve issues	3.1. Liaise with team members/stakeholders to develop agreed, and where possible win-win, solutions 3.2. Negotiate acceptable solutions as required in accordance with company practices/procedures 3.3. Obtain any required official authorisations 3.4. Consult with relevant stakeholders to develop implementation plan 3.5. Implement solution
4. Monitor ongoing situation	4.1. Determine relevant Key Performance Indicators (KPIs) for plan 4.2. Check that implementation is proceeding to plan 4.3. Check for unforeseen consequences 4.4. Take appropriate action to resolve any arising issues

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• negotiating • communication • teamwork • problem solving
Required knowledge
• knowledge of industrial relations structures • relevant awards and agreements • types of workforce structures and reward systems

Evidence Guide

EVIDENCE GUIDE

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EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	The person will be able to develop a relationship with the team members which will make a positive contribution to the organisation.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies is required. No other specific resources are required.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of managing people relationships and dealing with issues.
In what context should assessment occur?	Assessment will need to occur in a competitive manufacturing organisation and where the individual is responsible for managing people relationships or by case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Evidence should be available from an extended period of time and may be historic if the person has been in this role for some time.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	***Competitive manufacturing*** is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Key personnel	Key personnel for communication include formally identified managers, supervisors and workforce

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RANGE STATEMENT	
	delegates as well as key opinion shapers (such as employees with specialist technical knowledge) on the issue being communicated.
Formal mechanisms	Formal mechanisms for communication will vary according to the enterprise but may include notice boards, employee circulars, consultative committees, staff associations, union representatives, team leaders.
Stakeholders	Stakeholders include team members, personnel officers, industrial officers, union delegates, production management, human relations management, financial management, engineering/technical personnel.

Unit Sector(s)

Unit Sector	CM Change/interpersonal

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMC610A Manage relationships with non-customer external organisations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit is focused on the skills needed to identify and manage relationships with non-customer external organisations such as community groups, other businesses, training providers, research organisations and government departments.

Application of the Unit

Application of the unit	In a typical scenario, the person (who may be a section leader, production manager or similar) will be expected to deal with a range of external organisations. Some of these will be relationships initiated by the manager's organisation, others will not. Regardless they need to be managed to the maximum benefit of the organisation and the organisation's customers. This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Problem solving, initiative and enterprise, and planning and organising are required to effectively manage organisational relationships. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into relationship systems and expectations.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify mutual interest	1.1. Clarify the ***reason contact*** was/is to be made 1.2. Identify expectations of initiating organisation 1.3. Discuss expectations, ability to meet those expectations and areas of mutual interest
2. Determine contribution of relationship	2.1. Identify any value contributions from relationship 2.2. Identify ***waste*** arising from relationship 2.3. Classify waste as necessary or unnecessary
3. Manage the relationship. in order to enhance the enterprise reputation, efficiency and profitability	3.1. Measure performance of relationship against expectations 3.2. Develop systems to enhance mutual benefit and value contributions from relationship 3.3. Develop systems to minimise and control ***necessary waste*** without causing harm 3.4. Eliminate ***unnecessary waste*** where possible without causing harm

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ELEMENT	PERFORMANCE CRITERIA
	3.5. Manage or terminate the relationship is a manner which enhances the organisation

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• communication • negotiation • planning
Required knowledge
• strategic requirements of own organisation • strategic benefits to the organisation from liaisons with external organisations • possible external organisations which may offer benefits • benefits which can be offered to the external organisations • customer benefits/features from products

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for the Training Package.	
Overview of assessment requirements	The person will deal with a range of non-customer external organisations. Relationships will be managed so as to be of benefit.
What are the specific resource requirements for this unit?	Access to an organisation using competitive manufacturing.
What critical aspects of evidence are required to demonstrate competency	Evidence of relationships with external, non-customer organisations and their management.

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EVIDENCE GUIDE	
in this unit?	
In what context should assessment occur?	Assessment will occur in an organisation following competitive manufacturing or by a suitable case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	There should be evidence from a number of relationships managed over an extended period.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential

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RANGE STATEMENT operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Reason contact	Contacts may be made for the purpose of research, innovation, mutual cooperation, strategic alliances, computer (or other) technology, emergency response etc.
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items. Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Necessary waste	Necessary waste is any activity or cost which does not contribute directly to customer benefit/feature in the product, and which **cannot** be avoided (for example regulatory compliance and fixed costs). Necessary waste cannot be eliminated but should be managed.
Unnecessary waste	Unnecessary waste is any activity or cost which does not contribute directly to customer benefit/features in the product and **can** be avoided. Unnecessary waste should be eliminated as quickly as practical.

Unit Sector(s)

Unit Sector	CM Change/interpersonal

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Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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TAEDEL301A Provide work skill instruction

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to conduct individual and group instruction and demonstrate work skills, using existing learning resources in a safe and comfortable learning environment. The unit covers the skills and knowledge required to determine the success of both the training provided and one's own personal training performance. It emphasises the training as being driven by the work process and context.

Application of the Unit

Application of the unit	This unit supports a wide range of applications across any workplace setting and so can be used by any organisation. Its use is not restricted to training organisations.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Organise instruction and demonstration	1.1. Gather information about ***learner characteristics*** and learning needs 1.2. Confirm a ***safe learning environment*** 1.3. Gather and check ***instruction and demonstration objectives*** and seek assistance if required 1.4. Access and review relevant ***learning resources*** and ***learning materials*** for suitability and relevance, and seek assistance to interpret the contextual application 1.5. Organise access to necessary equipment or physical resources required for instruction and demonstration 1.6. Notify learners of ***details*** regarding the implementation of the learning program and/or delivery plan
2. Conduct instruction and demonstration	2.1. Use interpersonal skills with learners to establish a safe and comfortable learning environment 2.2. Follow the learning program and/or delivery plan to cover all learning objectives 2.3. Brief learners on any ***OHS procedures*** and requirements prior to and during training 2.4. Use ***delivery techniques*** to structure, pace and enhance learning 2.5. Apply ***coaching*** techniques to assist learning 2.6. Use communication skills to provide information,

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ELEMENT	PERFORMANCE CRITERIA
	instruct learners and demonstrate relevant work skills 2.7. Provide opportunities for practice during instruction and through work activities 2.8. Provide and discuss feedback on learner performance to support learning
3. Check training performance	3.1. Use ***measures*** to ensure learners are acquiring and can use new technical and generic skills and knowledge 3.2. Monitor learner progress and outcomes in consultation with learner 3.3. Review relationship between the trainer/coach and the learner and adjust to suit learner needs
4. Review personal training performance and finalise documentation	4.1. Reflect upon personal performance in providing instruction and demonstration, and document strategies for improvement 4.2. Maintain, store and secure learner records according to organisational and legal requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills

• verbaland non-verbal communication techniques, such as:
  • asking relevant and appropriate questions
  • providing explanations
  • demonstrating
  • using listening skills
  • providing information clearly
• safety skills to implement OHS requirements, by acting and responding safely in order to:
  • identify hazards
  • conduct prestart-up checks if required
  • observe and interpret learner behaviour that may put people at risk
• time-management, skills to:

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REQUIRED SKILLS AND KNOWLEDGE

- ensure all learning objectives are covered
- pace learning

- reflection skills in order to:
  - identify areas for improvement
  - maintain personal skill development
- literacy skills to:
  - complete and maintain documentation
  - read and follow learning programs and plans
  - read and analyse learner information
- technology skills to operate audio-visual and technical equipment
- interpersonal skills to:
  - engage, motivate and connect with learners
  - provide constructive feedback
  - maintain appropriate relationships
  - establish trust
  - use appropriate body language
  - maintain humour
  - demonstrate tolerance
  - manage a group
  - recognise and be sensitive to individual difference and diversity
- observation skills to:
  - monitor learner acquisition of new skills, knowledge and competency requirements
  - assess learner communication and skills in interacting with others
  - identify learner concerns
  - recognise learner readiness to take on new skills and tasks

Required knowledge

- learner characteristics and needs
- content and requirements of the relevant learning program and/or delivery plan
- sources and availability of relevant learning resources and learning materials
- content of learning resources and learning materials
- training techniques that enhance learning and when to use them
- introductory knowledge of learning principles and learning styles
- key OHS issues in the learning environment, including:
  - roles and responsibilities of key personnel
  - responsibilities of learners
  - relevant policies and procedures, including hazard identification, risk assessment, reporting requirements, safe use of equipment and emergency

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REQUIRED SKILLS AND KNOWLEDGE
procedures • risk controls for the specific learning environment

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	Assessment must address the scope of this unit and reflect all components of the unit. A range of appropriate assessment methods and evidence-gathering techniques must be used to determine competency. A judgement of competency should only be made when the assessor is confident that the required outcomes of the unit have been achieved and that consistent performance has been demonstrated.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the ability to:
	• carry out aminimum of three training sessions, involving demonstrating and instructing particular work skills for different groups; with each session addressing:
	  • different learning objectives
	  • a range of techniques and effective communication skills appropriate to the audience.

Context of and specific resources for assessment	Evidence must be gathered in the workplace wherever possible. Where no workplace is available, a simulated workplace must be provided.
Method of assessment	
Guidance information for assessment	For further information about assessment of this and other TAE units, refer to relevant implementation guidance published on the IBSA website (www.ibsa.org.au).

Range Statement

RANGE STATEMENT

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RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Learner characteristics may include:	• language, literacy and numeracy levels • learning styles • past learning and work experiences • specific needs • workplace culture.
Safe learning environment may include:	• exit requirements • personal protective equipment • safe access • safe use of equipment.

Instruction and demonstration objectives may include:	• competencies to be achieved
	• generic and technical skills, which may be:
	  • provided by the organisation
	  • developed by a colleague
	  • individual or group objectives
	  • learning outcomes.

Learning resources may include:	• any material used to support learning, such as:
	  • learner and user guides
	  • trainer and facilitator guides
	  • example training programs
	  • specific case studies
	  • professional development materials
	  • assessment materials
	• a variety of formats
	• those produced locally
	• those acquired from other sources.

Learning materials may include:	• handouts for learners • materials sourced from the workplace, e.g. workplace documentation, operating procedures, and specifications.
Details may include:	• location and time • outcomes of instruction or demonstration • reason for instruction or demonstration • who will be attending instruction session.

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RANGE STATEMENT	
OHS procedures may include:	• emergency procedures • hazards and their means of control • incident reporting • use of personal protective equipment • safe work practices • safety briefings • site-specific safety rules.
Delivery techniques may include:	• coaching • demonstration • explanation • group or pair work • providing opportunities to practise skills and solve problems • questions and answers.
Coaching may include:	• learning arrangements requiring immediate interaction and feedback • on-the-job instruction and 'buddy' systems • relationships targeting enhanced performance • short-term learning arrangements • working on a one-to-one basis.
Measures may include:	• informal review or discussion • learner survey • on-the-job observation • review of peer coaching arrangements.

Unit Sector(s)

Unit sector	Delivery and facilitation

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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PUAWER009B Participate as a member of a workplace emergency initial response team

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

This unit covers the competency required to participate as a member of a workplace emergency initial response team. This team works in conjunction with the emergency control organisation in the control of workplace emergencies in their early stages prior to the arrival of emergency services or specialist response teams.

This unit:

- has been developed to cover the broad range of ***emergencies*** and ***workplaces*** as considered in Australian Standard 37452002
- is part of a suite of eleven workplace emergency response units of competency that has three streams
- is part of the initial response stream.

This unit does not cover the competency required for crisis management, recovery or restoration.

Application of the Unit

Application of the Unit

The application of this unit in the workplace - the environments, complexities and situations involved - will be written during Phase II of the Review of the PUA00 Public Safety Training Package.

This text will be useful for the purposes of job descriptions, recruitment advice or job analysis; where possible, it will not be too job specific to allow other industries to import it into other Training Packages, where feasible.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite Unit/s Nil

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a Unit of Competency.	Performance Criteria describe the required performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the Required Skills and Knowledge and/or the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare for workplace emergencies**	1.1 ***Emergency equipment*** assigned for use by the initial response team is stored and maintained in a safe, accessible and serviceable state 1.2 Current workplace emergency procedures to be used by employees are identified and accessed 1.3 Risk assessment of initial response team activities is undertaken according to workplace procedures 1.4 Initial response team training activities are undertaken according to workplace emergency procedures and relevant legislation
2. **Respond to workplace emergencies**	2.1 Emergency is responded to according to workplace emergency procedures 2.2 Emergency situation is assessed for hazards and

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ELEMENT	PERFORMANCE CRITERIA
	appropriate ***precautions*** against those ***hazards*** are implemented
	2.3 Identified hazards are reported to people in danger and the initial response team leader
	2.4 Instructions from the initial response team leader are confirmed and implemented safely and promptly
	2.5 Appropriate equipment is selected and operated according to workplace emergency procedures
	2.6 Situation is contained to the extent necessary to prevent an escalation of the emergency and to enable emergency services and specialist response team activity to be completed safely
3. **Communicate with and complement other personnel**	3.1 Effective communication with initial response team members and initial response team leader is constantly maintained
	3.2 Activities are consistent with the initial response team leader's plan of action and support the work of other initial response team members
	3.3 Activities support the actions of ***other initial response teams***
	3.4 Any injuries, accidents or near misses involving team members are reported to the team leader
4. **Assist with recovery from workplace emergencies**	4.1 Evidence relating to the cause, origin and progress of the emergency is preserved and recorded as far as possible
	4.2 Appropriate assistance is provided in accordance with the workplace emergency procedures
	4.3 Emergency equipment is returned to a state of readiness as soon as is reasonably practicable
	4.4 Debriefings are attended and participated in as appropriate

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required Skills

- access and use protective clothing and equipment safely and effectively under emergency conditions
- communication skills during emergencies
- care for protective clothing and equipment
- interpret and respond to alarm systems
- re-stow initial response equipment

Required Knowledge

- alarm systems and associated equipment
- appropriate personal protective clothing and equipment
- concept of dynamic risk assessment
- equipment operating characteristics, limitations, hazards, precautions, procedures and general care
- general emergency priorities and strategies
- hazard analysis
- hazards and the precautions necessary during control activities
- procedures for responding to alarms
- survival, rescue and recovery procedures
- tactics for safely handling specific emergencies
- workplace emergency procedures

Evidence Guide

EVIDENCE GUIDE

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessment must confirm the ability to be prepared for a safe and prompt response to a workplace emergency; to identify hazards and implement appropriate precautions; to use equipment safely and effectively; and to work as a team member safely and effectively under the direction of a workplace emergency initial response team leader **Consistency in performance** Competency should be demonstrated over time with a

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EVIDENCE GUIDE

	range of emergencies that could be expected in the workplace, including dealing with plausible contingencies
Context of and specific resources for assessment	**Context of assessment** Competency should be assessed in a simulated environment under conditions that safely replicate workplace emergency situations **Specific resources for assessment** Access to: • scenarios that reflect a range of emergency situations that may be expected in the workplace • material safety data sheets • workplace register of hazardous substances
Guidance information for assessment	Information that will assist or guide assessment will be written during Phase II of the Review of the PUA00 Public Safety Training Package.

Range Statement

RANGE STATEMENT

The Range Statement relates to the Unit of Competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording in the Performance Criteria is detailed below.

Emergency services or specialist response teams may include	Ambulance/medical services Coast guard Defence workplace response teams Fire services Organisational specialist response team Organisations identified as response or support agencies as defined in the appropriate state/territory and/or commonwealth legislation Other external agencies such as hazmat teams, bomb squads, animal rescue services Police services Relevant state/territory and commonwealth authorities

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RANGE STATEMENT

	(such as environmental protection)
	Rescue services
Emergencies must include those emergencies identified by the workplace hazard analysis, **which may include**	Animal or livestock emergencies
	Bomb threat
	Building invasion/armed invasion
	Chemical, biological and radiological
	Civil disorder
	Criminal acts
	Cyclones, including storm surge
	Deliberate self-harm
	Earthquake
	Failure of utilities
	Fire
	Flood
	Hazardous substances incidents
	Hostage situations
	Industrial accident
	Letter bomb
	Medical emergency
	Severe weather/storm damage
	Structural instability
	Terrorism
	Transport accident
	Toxic emission
	Veterinary emergencies
	Wildfire
Workplaces include	Workplaces, buildings and structures as outlined in Australian Standard 37452002
Emergency equipment may include	Emergency vehicles, trailers, trolleys or caches
	Fire protection equipment
	Forcible entry tools
	Life support equipment

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RANGE STATEMENT

	Monitors (or turrets) Personal protective clothing and equipment Rescue equipment Spill or leak control kits
Hazards may include	Chemical, biological, radiological Climatic Electrical Environmental Explosive Fire Mechanical Psychological (eg critical incident stress) Noise related Security related Storm/flood Structural Thermal Wildlife related
Precautions may include	Risk controls developed by using the hierarchy of controls, also called the safety decision hierarchy, with the priority being in order of: • eliminate the hazard • substitute with a lesser hazard • isolate the hazard • engineer controls i.e. guarding • implement procedures to minimise risk • use appropriate personal protective equipment
Other initial response teams may include	Damage control Emergency control organisation Fire team First aid Maintenance Security

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RANGE STATEMENT

Unit Sector(s)

Not applicable.

Corequisite Unit/s

Co-requisite Unit/s Nil

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MSL973012A Assist with geotechnical site investigations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare for and assist with site activities such as excavations, sampling and testing as part of a geotechnical investigation team. Personnel are expected to identify common site problems and seek advice to deal with situations beyond their own technical competence.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants working under the close supervision of a senior technician in the construction, mining and drilling industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for on-site operations	1.1. Confirm details of the job, location, work instructions, appropriate sampling/test procedures and safety requirements with supervisor 1.2. Identify likely site hazards, personal protective equipment and safety procedures that are specified for the job and materials used 1.3. Collect, check, and stow all tools, equipment and materials required at the site 1.4. Confirm site access requirements such as entry permits and participate in safety induction as required
2. Assist with excavation of boreholes, test pits and/or trenches	2.1. Confirm specified sampling/testing locations with supervisor 2.2. Excavate to the specified sampling/testing depth, minimising disturbance and potential contamination of the site 2.3. Ensure materials from different strata are kept separate

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Recognise materials and record changes of strata, test results
3. Assist with site sampling	3.1. Prepare and check sampling equipment and materials 3.2. Take disturbed and undisturbed samples as directed and in accordance with enterprise methods/procedures 3.3. Label samples and record samples/site conditions in accordance with enterprise methods/procedures
4. Assist with site testing	4.1. Conduct pre-use checks of test equipment 4.2. Perform basic tests as directed and in accordance with test methods or enterprise procedures 4.3. Record data in accordance with test methods or enterprise procedures 4.4. Recognise obvious errors or atypical data and seek advice
5. Assist with finalising site operations	5.1. Reinstate the site in accordance with instructions 5.2. Clean all equipment (and vehicle as necessary) avoiding environmental damage, stormwater contamination or spread of pests 5.3. Check all equipment/materials prior to re-stowing them for safe transport 5.4. Handle and transport samples in accordance with enterprise procedures 5.5. Notify appropriate site personnel on completion of tasks and prior to leaving site (if unsupervised) 5.6. On return to base, check serviceability of test equipment before storage
6. Assist with maintaining records	6.1. Complete relevant parts of site safety plans, equipment logs and test reports in accordance with enterprise procedures 6.2. Maintain confidentiality of enterprise information
7. Maintain a safe work environment	7.1. Use safe work procedures and protective equipment to ensure personal safety and that of others 7.2. Minimise environmental impacts of testing/sampling and generation of waste 7.3. Collect and/or dispose of all waste in accordance with enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting maps, site plans and drawings
- recognising site services, sampling and testing sites
- setting up, checking, using and cleaning/maintaining tools and equipment
- taking representative samples, handling and transporting samples
- recognising soil, rock and fill materials
- recognising site features and geotechnical conditions
- performing basic insitu tests and site measurements (e.g. location and depth)
- maintaining accurate and compete records
- communicating problems to appropriate personnel
- driving safely on and off-road
- working safely on construction sites around heavy equipment and earthmoving plant

Required knowledge

Required knowledge includes:

- the basic concepts, purposes and principles of geotechnical site investigation
- site safety and management rules (safety induction, risk assessments, controlledentry/exit to site and required protective equipment and clothing)
- simple methods for identifying and classifying materials
- basic engineering properties of soil and rock materials and their use in engineering and construction
- basic principles of representative sampling and testing
- basic insitu testing methods
- relevant occupational health, safety (OHS) and environment requirements

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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EVIDENCE GUIDE	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • prepare for site operations and perform geotechnical sampling, testing and site reinstatement under direction • work safely at geotechnical investigation sites • follow instructions and work as part of a small team.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used. This unit of competency may be assessed with: • *MSL952002A Handle and transport samples or equipment* • *MSL952001A Collectroutine site samples* • *MSL973001A Perform basic tests*. Resources may include: • access to geotechnical sites, tools, equipment • enterprise procedures, sampling plans, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • examples of completed workplace documentation • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or

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EVIDENCE GUIDE	
	assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A geotechnical consultancy company is carrying out the investigation for the construction of an industrial complex involving building pads and roadways. A contract drilling company has been hired to carry out auger drilling for the building pad foundations. The drill rig will be used to perform standard penetration tests in some boreholes to determine bearing capacities. Undisturbed sample tubes will be pushed to obtain samples for consolidation testing in the laboratory. A senior technician is in charge of site activities and arranges for the drill rig to be on-site. She/he plans a program of drilling, sampling and testing and a laboratory assistant is assigned to assist with drilling, testing and sampling operations at the site. The senior technician has a marked-up plan of the site showing borehole locations to help him/her direct where to drill. The drilling contractor operates the drill rig, takes tube samples, performs the standard penetration tests and cases the hole if required, as directed by the senior technician. The assistant assists with recording and sampling the soil profile, sealing the sample tubes with wax and labeling them. He/she also records the SPT readings and bags and labels the material from the split-spoon sampler. Each borehole is capped to prevent access by unauthorised persons so that the assistant can record the standing water level 24 hours after the hole has been drilled. The assistant wears a helmet, work boots and earmuffs while working near the rig. He/she covers up and wears sunscreen while working in the sun and drinks large quantities of water. The assistant also excavates hand auger holes to a depth of 1 m at regular intervals in the proposed roadways to obtain samples for California Bearing Ratio (CBR) tests.

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EVIDENCE GUIDE	
	Adjacent to each, he/she performs a dynamic cone penetrometer test to 2 m to assess the insitu material. He/she records the logs of the auger holes and the test results on the company's standard data sheets and backfills each auger hole immediately after sampling.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• environmental legislation and regulations
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• industry codes of practice
	• material, production and product specifications

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RANGE STATEMENT	
	• National Association of Testing Authorities (NATA) documents regarding construction materials testing • OHS national standards and codes of practice • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Site hazards	Site hazards may include: • solar radiation, dust and noise • manual handling of heavy materials and equipment • working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes • vehicular and pedestrian traffic • underground services such as gas and electricity
Safety procedures	Safety procedures may include: • location of site services before investigations commence • use of material safety data sheets (MSDS) • use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls and safety boots • handling and storage of (hazardous) materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning of equipment and vehicles • machinery guards • signage, barriers, flashing lights and traffic control
Tools and equipment	Tools and equipment may include: • hand tools, including shovels, crowbars, scoops, spanners, wrenches and tape measure • consumables, including sample bags, labels, sample tubes and wax • documentation, including maps, plans and worksheets • field test equipment, including dynamic cone

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RANGE STATEMENT	
	penetration (DCP) testing, standard penetration testing (SPT), shear vane, pocket penetrometers and water level indicator • safety clothing and equipment, including helmets, boots, gloves, earmuffs and glasses • excavation equipment, including hand and power augers, powered excavators, generators and jack hammers
Common site problems	Common site problems may include: • caving in of excavation walls • drilling difficulties • sample loss during retrieval • knowing when to stop a hole, or what and when to test and sample • misidentification of samples and sampling locations • equipment breakdown and breakage • environmental impacts of construction activities on wildlife, vegetation, waterways and inclement weather • working close to earth moving equipment, trucks and overhead loads
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973007A Perform microscopic examination

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to set up a light microscope for optimum resolution, to prepare routine samples and to observe, identify and report sample characteristics.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or technical assistants in all industry sectors. The unit of competency covers limited interpretation and analysis of results. Troubleshooting of equipment and procedures is not required. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret test requirements	1.1. Review test request to identify samples to be tested, test method and equipment involved 1.2. Identify hazards associated with the sample, preparation methods and equipment and implement enterprise control measures
2. Set up work area for preparation and examination of samples	2.1. Collect equipment and arrange the workspace so that equipment can be used safely and efficiently 2.2. Perform pre-use and safety checks to ensure equipment is fit for purpose and report faulty or unsafe equipment to appropriate personnel
3. Prepare samples for examination	3.1. Log and label samples according to enterprise procedures to ensure traceability 3.2. Check suitability of the original and prepared sample for the examination and report unsuitable samples to appropriate personnel 3.3. Prepare and store the sample for examination following enterprise methods

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ELEMENT	PERFORMANCE CRITERIA
4. Set up and use a light microscope	4.1. Set up the light path to optimise resolution 4.2. Select the appropriate objectives and filter for the sample being examined 4.3. Ensure that the lenses are clean 4.4. Adjust settings and alignment of the light path to optimise performance 4.5. Place sample correctly on the stage
5. Observe, identify and report sample characteristics	5.1. Recognise and identify significant sample characteristics 5.2. Perform required calculations accurately 5.3. Prepare and view control samples and check that results are consistent with expected values 5.4. Identify and report out of specification or atypical results promptly to appropriate personnel 5.5. Record and report data in accordance with enterprise procedures
6. Maintain a safe work environment	6.1. Ensure safety and minimise cross-contamination through the use of personal protective clothing and safety equipment 6.2. Handle all samples and equipment in accordance with enterprise safety protocols 6.3. Clean up spills using appropriate techniques to protect personnel, work area and environment 6.4. Minimise generation of waste and environmental impacts 6.5. Collect and dispose of all wastes safely 6.6. Report hazards and incidents to designated personnel using enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • setting up the workbench and microscope ergonomically

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REQUIRED SKILLS AND KNOWLEDGE
• setting up, cleaning and using a light microscope to achieve optimum resolution of the specimen • using personal protective clothing and other safety equipment correctly • performing counts on samples • performing basic measurements using grids • logging and tracking samples through all steps from receiving a sample through to completion of a procedure and reporting • interpreting and recording test results, including simple calculations • correctly handling and storing samples and equipment
Required knowledge
Required knowledge includes: • parts and functions of a light microscope • importance and appropriate use of controls and certified reference materials • hazards and risks in laboratories associated with performing microscopic examination • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements **Specific industry** Additional knowledge requirements may apply for different industry sectors. For example: Biological industry: • basic structure and function of cells and organelles • basic classes and classification of organisms of organisms, such as prokaryotes, eukaryotes, plants, animals, bacteria, viruses and prions • cell physiology and processes, such as simple and facilitated diffusion, plasmolysis, osmosis, tonicity, active transport, energy production, mitosis, motility, phagocytosis and pinocystosis • purposes and mechanisms of staining (e.g. Gram +ve and -ve)

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • follow enterprise standards, procedures and practices • prepare suitable samples • recognise, identify and document significant sample characteristics • set up a light microscope for optimal resolution • maintain personal safety and that of others • minimise cross-contamination and contamination of the laboratory and environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data* • *MSL933002A Contribute to the achievement of quality objectives* • *MSL943002A Participate in laboratory/field workplace safety* • *MSL953001A Receive and prepare samples for testing*. Resources may include: • standard laboratory equipped with appropriate equipment, such as light microscopes and samples • enterprise procedures, standard methods and materials.
Method of assessment	The following assessment methods are suggested: • observation of the candidate performing microscopic examinations • review of data records prepared by the candidate, such as counts, observations and results • feedback from supervisors and peers about adherence to enterprise/technical procedures • questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and

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EVIDENCE GUIDE	
	disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials testing** The supply of river sand is running out and quarries are accessing alternative sources of sand for use in concrete mixes in construction. The sand should not be an aggregate that is likely to break down into smaller particles. A technician in a quarry company is required to analyse samples of crushed rock using a light microscope. The technician looks for characteristics of the sample, such as angularities, roundness, sharpness, cracks, presence of organic matter, mineral structure and whether the particles are a conglomerate. If the sample does not meet the characteristics, the company will need to treat it to make it suitable for use in concrete mixes (for example by washing, crushing and sieving). **Food processing** A customer complaint is received about the baking properties of a flour delivery. The laboratory assistant at the flour mill is given the task of testing the starch content of the suspect flour. He/she prepares iodine stained samples of the returned flour and a range of baked and partially baked products prepared from it. First, the assistant makes up fresh iodine staining solution and then prepares slides of each sample for microscopic examination. He/she identifies the characteristic starch granules of the flour sample and records the degree of gelatinisation in the starch granules in the baked samples. He/she discusses the results with the supervisor and prepares a report for the customer. **Biomedical** A laboratory assistant works in the microbiology laboratory of a public hospital and is responsible for

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EVIDENCE GUIDE	
	preparing and staining sputum smears from patients for micro and culture. The assistant puts on a clean gown and gloves before collecting the specimens from the reception area of the laboratory. The assistant prepares cultures of the sputum specimens on simple and selective media before preparing, fixing and staining smears for microscopic examination. The results are checked by the supervisor, entered into the laboratory information management system (LIMS) and sent to the appropriate section of the hospital. **Environmental** A laboratory assistant prepares media for plant tissue culture. There has been some contamination of Gram-positive bacteria in the last two batches and the supervisor has initiated an overhaul of the preparation and aliquotting procedure. The laboratory assistant has been asked to follow the new procedure exactly and to remove samples at each stage of ingredient addition for microscopic examination. The laboratory assistant records the exact addition amounts, batch numbers and brands of the reagents, the location of the addition (which biohazard cabinet), the equipment used and the pre-sterilisation records of all equipment. The laboratory assistant then prepares slides, fixes them and performs a Gram stain on each of the aliquots removed from the new preparation run. Microscopic analysis of each aliquot reveals nil contamination. The supervisor decides that there has been a breach in the old procedure and the laboratory assistant is asked to follow the new procedure and to perform a routine microscopic check on all batches for the next month.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• principles of good laboratory practice (GLP)
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• safety manuals
	• quality manuals and equipment and procedure manuals
	• standard operating procedures (SOPs)
	• material safety data sheets (MSDS)
	• enterprise recording and reporting procedures
	• production and laboratory schedules
	• material, production and product specifications

Preparation of samples	Preparation of samples may include: • aseptic transfer of specimen • centrifugation • cooling • drying • filling a counting chamber in one continuous flow without bubbles or overflow • filtration • fixing of films to minimise cell damage and the production of artefacts • labelling • mounting of stained films, sections and whole mounts to ensure long term preservation • permanent labels for smears, films and sections for presentation, storage and retrieval • physical or chemical separation

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RANGE STATEMENT	
	• selection of diluent to preserve or enhance visibility of the cells to be counted • selection, filling and cover slipping of a clean, dry counting chamber to ensure even distribution of cells during filling • serial dilution to enable individual cells to be reliably counted • staining of fixed material to illustrate required characteristics • sub-sampling • thin film or smear on a slide
Checking sample condition	Checking sample condition may include: • labelling • spillage • spoilage due to incorrect storage and transport conditions • temperature control • suitability for the examination
Pre-use checks	Pre-use checks may include: • calibration • cleaning/checking use by dates of reagents • routine maintenance
Equipment	Equipment may include: • glass slides • counting chambers (e.g. haemocytometer) • optical graticules and stage micrometers • tissue culture flasks
Light microscopes	Light microscopes may include: • bright field illumination microscopic examination up to 1000x magnification • stereomicroscopes and dissection microscopes • compound microscopes • phase contrast microscopes • inverted microscopes
Biological samples	Biological samples may include: • smears, impression smears, sections, squashes, films and whole mounts • a monolayer of cells in smears and films

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RANGE STATEMENT	
	• fixed smears for demonstration of bacteria by the methylene blue and Gram staining techniques • blood films stained by a Romanowsky technique to clearly show differentiation of granulocytes • stained sections of animal tissues using regressive haematoxylin and eosin to differentiate cytoplasmic and nuclear detail • differentially stained monocotyledon and dicotyledon stem sections to demonstrate the structure of vascular bundles (xylem, phloem and cambium) • stained whole mounts of helminths • whole mounts, such as liver flukes, planaria and samples of animal faeces to demonstrate ova, cysts and larvae • pond water organisms • onion root tip squash • midstream sample of urine
Physical samples	Physical samples may include: • sand • asbestos fibres • coal samples • construction testing materials • geological specimens
Checking prepared samples	Checking prepared samples may include looking for: • clean and scratch-free microscope slides to reduce artefacts • preparation according to SOPs • a homogeneous suspension of sample • films and smears that have been fixed rapidly • thin films with a monolayer of cells • appropriate whole mounts for intact organisms • correct sample identification during and after processing
Sample characteristics	Sample characteristics are restricted to what can be viewed by bright light microscopy and may include:

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RANGE STATEMENT	
	• shape and size of particles • presence of contamination • colour • consistency and variability • number of cells (e.g. cells in blood or other particulate samples, such as a yeast suspension or pollen grains) • type of cells, percentage of atypical cells, presence/absence of cells, size of cells, viable and non-viable cells and trajectory • presence of stained material, such as starch • colour/staining and morphology • motility
Calculations	Calculations may include: • dilutions • percentage viability • number of cells in original sample after dilution • calculation of cells/ml in a number of squares of a counting chamber
Hazards	Hazards may include: • micro-organisms and agents associated with soil, air, water, blood and blood products and human or animal tissue and fluids • chemicals and stains • sharps and broken glassware • aerosols
Safety practices and personal protective equipment	Safety practices and personal protective equipment may include: • use of MSDS • use of personal protective equipment, such as safety glasses, gloves and coveralls • use of biohazard containers and laminar flow cabinet • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS and manufacturer's instructions • ergonomic layout, correct illumination and

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RANGE STATEMENT	
	organisation of workbench • regular cleaning and/or decontamination of equipment and work areas
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL973004A Perform aseptic techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform aseptic techniques to maintain the integrity of both the sample source and the sample. It applies to sampling techniques in tissue culture and to generic microbiological procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and technicians working in the field or laboratory in the biomedical, biological, food processing and environmental industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for aseptic sampling or transfer	1.1. Ensure that any sampling procedure conforms with the requirements of the sampling plan 1.2. Use specified personal protective clothing and equipment 1.3. Prepare the work area for safe and effective sample transfer 1.4. Select equipment and materials specified by the procedure 1.5. Organise equipment to minimise contamination during manipulations 1.6. Label containers for clear identification 1.7. Record details in relevant log or database
2. Transfer materials aseptically	2.1. Protect the integrity of the sample source by sterilising the sampling site and the mouth of transport or culture vessel 2.2. Sterilise inoculating loops and/or pipette where used

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ELEMENT	PERFORMANCE CRITERIA
	to prevent contamination 2.3. Perform transfer while minimising opportunities for contamination and cross-infection 2.4. After transfer, and before sealing the transport or culture vessel, flame the vessel mouth to maintain sterility 2.5. Re-sterilise inoculating loops, minimising the generation of aerosols 2.6. Perform quality control checks, if required 2.7. Label transport or culture vessels for clear identification
3. Maintain work area and equipment to prevent cross-infection and contamination	3.1. Place disposable and reusable items into relevant receptacles 3.2. Clean and disinfect work area and equipment after use 3.3. Transport disposable and reusable contaminated materials to relevant areas for disinfection, sterilisation and cleaning or disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- sterilising equipment such as flasks, loops and pipettes
- handling of laboratory equipment and glassware to prevent contamination
- streak plating of inoculations
- sampling transfers
- labelling and storing culture media according to enterprise procedures
- recording data accurately
- reporting non-compliance, anomalies or outofspecification results
- sorting, collecting, treating, recycling or disposing of waste
- following enterprise procedures consistently
- using appropriate personal protective equipment

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge includes: • the relationship between sterile practices, hygiene procedures and the ability to obtain growth free of contamination • cleaning and sanitising requirements of equipment and work areaand effects of physical and chemical agents on microbial growth and death • principles of infection control related to occupational health and safety (OHS), sampling and transfer of materials in microbiological investigations • disinfection and sterilisation procedures used in the collection, processing and safe disposal of samples and materials • importance of pure culture techniques and aseptic transfer to the successful microbiological investigation and correct interpretation of laboratory results • growth requirements of micro-organisms (bacteria, fungi, protozoans, viruses and multi-cellular parasites) in terms of their laboratory culture • relevant health, safety and environment requirements **Specific industry** Additional knowledge requirements may apply for different industry sectors. For example: Food processing: • food spoilage symptoms • food safety principles • beneficial/detrimental organisms relevant to specific food industry sector

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	In particular, assessors should look to see that the candidate: • follows established laboratory procedures, including recording of samples, operation of equipment and cleaning/decontamination • prevents cross-contamination of sample source and sample

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EVIDENCE GUIDE	
	• manipulates equipment to prevent contamination of culture medium during transfer • sterilises equipment as required to prevent cross-contamination of work area, personnel and environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL943002A Participate in laboratory/field workplace safety* • *MSL973003A Prepare culture media*. Resources may include: • standard laboratory with appropriate equipment and materials • enterprise procedures and standard methods • MSDS.
Method of assessment	The following assessment methods are suggested: • review of quality assurance results and examination of samples transferred by the candidate • observation of the candidate successfully transferring a range of samples • written and/or oral questioning to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of

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EVIDENCE GUIDE	
	competency and show its relevance in a workplace setting. **Food processing** As part of the quality assurance program at an ice-cream manufacturer, six ice-creams were removed from the production line, placed in sterile bags and then stored in a freezer in the microbiology laboratory. Later in the morning, the laboratory assistant removed the samples from the freezer, registered the samples with the date received and test code and signed the register book. She/he then placed the samples in a water bath set at 42(C. While the samples were melting, the laboratory assistant labelled the respective agar plates with the registered codes. Using aseptic techniques she/he carefully transferred 1ml of ice-cream mix into the total plate count agar. The plates were then placed in the incubator. The final results were noted and recorded. **Biomedical** In preparation for antibiotic sensitivity testing and biochemical identification of presumed pathogenic bacteria, a technical assistant was asked to prepare a sterile peptone suspension of a lactose fermenting colony. The colony had been previously identified by the supervisor on a MacConkey's agar plate. The assistant labelled a 5mL tube of peptone broth with the sample number and a code for the identified colony and then donned a pair of disposable gloves. Bringing the labelled tube and the MacConkey's plate near to the Bunsen, she/he took an inoculating loop and sterilised it in the incandescent flame. She/he carefully cooled the loop in a sterile area of the agar and gently scraped off half the colony. With the other hand, and in the vicinity of the heated air of the Bunsen, she/he removed the cover of the peptone tube in her/his crooked finger. In a continuous and coordinated way she/he flamed the lip of the tube and emulsified the colony in the broth. She/he then flamed the lip of the tube and replaced its cover. Finally, the technical assistant re-sterilised the inoculating loop by introducing and holding it in the Bunsen flame to minimise the generation of bacterial aerosols.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment and maintenance of associated environments in health care facilities
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australia New Zealand Food Standards (ANZFS) Code
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• client and product specifications
	• manufacturer's instructions or verbal direction from laboratory manager, supervisor or senior technician
	• material safety data sheets (MSDS)
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• National Health and Medical Research Council (NHMRC) Guidelines
	• OHS national standards and codes of practice

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RANGE STATEMENT	
	• operation and maintenance manuals for automated media preparation equipment • principles of good laboratory practice (GLP) • production schedules and instructions • standard operating procedures (SOPs)
Personal protective equipment	Personal protective equipment may include: • gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits and respirators • biohazard containers and laminar flow cabinets
Sample pot and transfer media and the subculturing and/or passaging of culture	Sample pot and transfer media and the subculturing and/or passaging of culture to: • sterile broth • media for isolation of colony • tissue culture media • media for continuous culture systems
Samples	Samples may include: • body fluids and liquids • water and soil • sterile pharmaceuticals • yeasts and moulds • milk and yoghurt • swabs and smears • propagation tissue • plant material • fermented foods and beverages
Equipment	Equipment may include: • transfer equipment, such as inoculating loops, pipettes (quantitative and qualitative), flasks, tubes and spatulas • Bunsen burners and bench incinerators • anaerobic jars • incubators, water baths, refrigerators, freezers and possibly dry ice and liquid nitrogen cylinders • laminar flow units and biohazard cabinets • autoclave or pressure cooker • swabs • continuous culture systems

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RANGE STATEMENT	
The range of material	The range of material may involve: • solid and/or liquid media • supplied media, such as media manufactured in the enterprise or raw material supplies for media • disinfecting and sterilising agents and materials, such as methylated spirits, ethanol and ether • disposable equipment and clothing • tissue culture media • growth media in broths, plates, deeps or slopes • receptacles for safe disposal of wastes and for processing of reusable materials • bar coding material and labels
Sterilisation techniques	Sterilisation techniques may include: • autoclaving • flaming • steam and membrane filtration • boiling • microwaving • radiation • high temperature • high pressure steam • gas and chemical treatments
Quality control checks	Quality control checks may include: • streaking out of cultures to a single colony • lawn cultures
Hazards	Hazards may include: • accessing the sample from difficult or dangerous areas • dry ice and liquid nitrogen vapour • ultraviolet (UV) light sources • heat from Bunsen burners • molten agar • sharps • hazardous substances and/or infectious agents
Workplace information	Workplace information may include: • SOPs

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RANGE STATEMENT	
	• specifications for safe waste disposal of bio-hazardous materials • production schedules and instructions • work notes • MSDS • manufacturer's instructions • verbal instructions from laboratory manager, supervisor or senior technician • guidelines for small scale genetic manipulation work
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL973002A Prepare working solutions

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare working solutions and to check that existing stocks are suitable for use. Calculations of quantities, choice of reagent grades and required dilutions will be specified by the supervisor.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants working in all industry sectors. Test solutions include those required to perform laboratory tests. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Safely use laboratory chemicals, glassware and equipment	1.1. Apply appropriate safety precautions for use of laboratory equipment and hazardous chemical materials 1.2. Use appropriate laboratory glassware and measuring equipment 1.3. Clean and store glassware and equipment in accordance with enterprise procedures
2. Make up working solutions	2.1. Identify the relevant standard methods for solution preparation 2.2. Assemble specified laboratory equipment 2.3. Select and prepare materials and solvent of specified purity 2.4. Measure appropriate quantities of reagents for solution preparation and record data 2.5. Prepare labels and log solution details in laboratory register 2.6. Transfer solutions to appropriately labelled containers
3. Check existing stock of solutions	3.1. Monitor shelf life of working solutions according to laboratory procedures

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ELEMENT	PERFORMANCE CRITERIA
	3.2. Replace out-of-date or reject solutions according to laboratory procedures 3.3. Conduct routine titrimetric analyses, if appropriate, to determine if solutions are fit for purpose

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using appropriate materials, equipment and procedures to prepare solutions
- following appropriate occupational health and safety (OHS), and hygiene procedures, if appropriate
- using all equipment safely and efficiently
- using enterprise procedures to calculate concentrations
- identifying solutions not fit for use
- using titrations to determine the concentration of solutions
- labelling, storing and disposing of solutions appropriately
- recording and presenting data appropriately

Required knowledge

Required knowledge includes:

- relevant biological, chemical, food and laboratory terminology
- principles of metrology
- the international system of units (SI)
- concentration terms, such as % w/w, % w/v, % v/v, ppm (mg/L) and molarity
- basic theory of acids, bases, salts, buffers and neutralisation
- enterprise procedures for preparing solutions
- calculations required to prepare specified amounts of solutions of specified concentration
- appropriate OHS procedure for preparing, handling and disposal of solutions
- use of material safety data sheets (MSDS)
- relevant health, safety and environment requirements

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • prepare working solutions in compliance with relevant standards, appropriate procedures and/or enterprise requirements • follow OHS procedures to safely use laboratory chemicals glassware and equipment • make up working solutions according enterprise procedures • check existing stocks of solutions as being fit for purpose.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data* • *MSL943002A Participate in laboratory/field workplace safety*. Resources may include: • standard laboratory equipped with appropriate equipment and reagents • SOPs and testing methods • access to appropriate containers and storage facilities.
Method of assessment	The following assessment methods are suggested: • inspection of solutions prepared, labelled and stored by the candidate • review of solution records and workplace documentation completed by the candidate • feedback from peers and supervisors • observation of the candidate preparing working solutions • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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EVIDENCE GUIDE	
	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** When starting materials used for the manufacture of common household materials are in transit from the supplier to the manufacturer, they may degrade if subjected to conditions, such as heat, moisture, light and oxygen. Even when the supplier ships quality materials to the manufacturing plant, the materials may be sub-standard when they arrive. Quality control tests are designed to test starting materials to ensure they are within specification. For example, aspirin forms salicylic acid when stored under adverse conditions. Laboratory assistants prepare and monitor the quality of solutions, such as ferric chloride solution, which gives an intense violet colour when added to salicylic acid but gives no colour with aspirin. Absence of the violet colouration indicates that breakdown of the aspirin hasn't occurred. **Biomedical** A laboratory assistant made up 1 litre of buffer solution using buffer tablets and a 1 litre volumetric flask as specified in the method. To ensure the solution was suitable for use the assistant measured the pH and found it was within acceptable range. The assistant then appropriately labelled a storage vessel and stored the buffer according to requirements. By following enterprise procedures the shelf life of the buffer was maximised.

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EVIDENCE GUIDE	
	Environmental An environmental laboratory is contracted to determine the acidity of water samples taken from local lakes and streams. A laboratory assistant is required to make up small batches of 0.01M sodium hydroxide and to determine its concentration by titrating it against a standard solution of potassium acid phthalate using phenolphthalein indicator. This procedure is carried out monthly to ensure that the concentration of the sodium hydroxide solution is accurately known. Alternatively, the laboratory assistant may be required to prepare and standardise a fresh batch of sodium hydroxide on a monthly basis. In this case, he/she must understand the underpinning knowledge of basic acid/base theory, potential problems of interferences (such as slow absorption of carbon dioxide by sodium hydroxide solution) so as to ensure that the concentrations of workup solutions are accurately known. He/she must also be skilled in calculating and performing dilution when required to prepare such low concentrations (0.01M) of working solutions.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards, such as: • AS 2163-2000 Laboratory glassware - Measuring cylinders

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RANGE STATEMENT	
	• AS 2165-1996 Laboratory glassware - Burettes AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware • AS ISO 1000-1998 The international system of units (SI) and its application • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • MSDS and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Typical test solutions	Typical test solutions may include: • solutions required for diagnostic/analytical and limit tests in food and chemical laboratories,

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RANGE STATEMENT	
	such as sulphates, chlorides and heavy metals • solutions, such as stains for standard diagnostic/analytical procedures in biomedical/environmental laboratories, such as cell staining, fixation of cells and tissues, suspension of cells and titrimetric indicators • solutions required for laboratory maintenance and disinfection, such as 70% ethanol and hypochlorite
Laboratory equipment	Laboratory equipment may include: • pH meters • balances • magnetic stirrers, water baths and hot plates • measuring cylinders, beakers, conical flasks, volumetric flasks, pipettes and burettes • filter papers and funnels • fume cupboards
Hazards	Hazards may include: • corrosive chemicals, such as acids and alkalis • sources of heat, such as burners • sharps and broken glassware • spillages
Safety precautions	Safety precautions may include: • use of MSDS • use of personal protective equipment, such as safety glasses, gloves and coveralls • correct labelling of reagents and hazardous materials • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontamination of equipment and work areas
Monitoring quality of solutions	Monitoring quality of solutions may include: • noting turbidity to exclude absorption of moisture • noting deposits to exclude microbial contamination or chemical degradation

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RANGE STATEMENT	
	• noting crystals to exclude evaporation • conducting titrations to check concentration • noting colour changes indicating a pH shift with solutions containing indicators • checking expiry dates on solution containers
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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Co-requisite units		

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MSL973001A Perform basic tests

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to perform tests and measurements using standard methods with access to readily available advice from supervisors.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory/field assistants working in all industry sectors. In general, they do not calibrate equipment and make only limited adjustments to the controls. They do not interpret or analyse results or troubleshoot equipment problems. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret test requirements	1.1. Review test request to identify samples to be tested, test method and equipment involved 1.2. Identify hazards and enterprise controls associated with the sample, preparation methods, reagents and/or equipment
2. Prepare sample	2.1. Record sample description, compare with specification, record and report discrepancies 2.2. Prepare sample in accordance with appropriate standard methods
3. Check equipment before use	3.1. Set up test equipment in accordance with test method 3.2. Perform pre-use and safety checks in accordance with enterprise procedures and manufacturer's instructions 3.3. Identify faulty or unsafe equipment and report to appropriate personnel 3.4. Check calibration status of equipment and report any out of calibration items to appropriate personnel
4. Perform tests on samples	4.1. Identify, prepare and weigh or measure sample and standards to be tested

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ELEMENT	PERFORMANCE CRITERIA
	4.2. Conduct tests in accordance with enterprise procedures 4.3. Record data in accordance with enterprise procedures 4.4. Perform calculations on data as required 4.5. Identify and report out of specification or atypical results promptly to appropriate personnel 4.6. Shut down equipment in accordance with operating procedures
5. Maintain a safe work environment	5.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 5.2. Minimise the generation of wastes and environmental impacts 5.3. Ensure safe disposal of laboratory and hazardous wastes 5.4. Clean, care for and store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting enterprise procedure or standard methods accurately
- using safety information, such as material safety data sheets (MSDS) and performing procedures safely
- checking test equipment before use
- completing all tests within required timeline without sacrificing safety, accuracy or quality
- calculating, recording and presenting results accurately and legibly
- maintaining security, integrity and traceability of all samples, data/results and documentation
- cleaning and maintaining equipment

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge includes: • concepts of metrology • the international system of units (SI) • purpose of test • principles of the standard method • pre-use equipment checks • relevant standards/specifications and their interpretation • sources of uncertainty in measurement and methods for control • enterprise and/or legal traceability requirements • interpretation and recording of test result, including simple calculations • procedures for recognition/reporting of unexpected or unusual results • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • accurately interpret enterprise procedures or standard methods • complete all tests within the required timeline without sacrificing safety, accuracy or quality • demonstrate close attention to the accuracy and precision of measurements and the data obtained • maintain the security, integrity and traceability of all samples, data/results and documentation.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL922001A Record and present data*. Resources may include: • standard laboratory equipped with appropriate

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	equipment standards and materials • enterprise procedures and standard methods, and equipment manuals • MSDS.
Method of assessment	The following assessment methods are suggested: • review of the quality of test data/results achieved by the candidate over time • inspection of records and workplace documentation completed by the candidate • feedback from peers and supervisors • observation of the candidate performing a range of basic tests • oral or written questioning to check underpinning knowledge of test procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** Standard testing methods may be viewed as legal requirements that must be followed to ensure that a product manufactured in a chemical plant meets the specification by which it is sold to the customer. Technical assistants perform tests in a quality control laboratory to ensure that material meets legal requirements and the material is safe and effective in use. Peroxides may be present in ether as a result of

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EVIDENCE GUIDE	
	light-catalysed air oxidation. Peroxides are toxic and can give rise to mixtures which are explosive when distilled. Technical assistants test ether to ensure that the level of peroxide is within acceptable limits. The test is done by shaking ether with a solution of potassium iodide. After standing for 30 minutes in the dark the yellow colour of the aqueous phase, due to the liberation of iodine, must not be more intense than a prepared standard solution. These tests ensure the quality and safety of the ether. **Food processing** A snack food company produces a range of high quality, impulse purchase snack foods. Some of these products are moisture and/or oxygen sensitive and are therefore packaged in multi-layer flexible packaging to provide optimum shelflife. The packaging must also be able to withstand the rigours of the production and distribution process. While the packaging is purchased to meet the shelflife and distribution specifications, the quality assurance program requires the periodic evaluation of the packaging materials against these specifications. A laboratory assistant uses standard methods to test the tearing resistance, bursting strength, impact resistance and permeability and/or leakage of the snack food packaging. Tests are also conducted on aspects of the manufacturing process that can affect shelflife. These tests involve the measuring of the heat-seam strength and the sealing performance of the closure process. The test results are recorded by the laboratory assistant to verify the conformance of the materials to the supplier specifications and of the process to the manufacturing specifications. The assistant reports any anomalies or non-conformances to the appropriate personnel. **Construction materials testing** A technician performs an Aggregate Stripping Test (AS 1141.50) and enters the results in the laboratory's information management system (LIMS). The resulting 20-30% stripped values (i.e. 70-80% adhering) indicate a 'fail' result. The technician notes that he has repeated the test and obtained the same 'fail' result. The laboratory manager reviews the results and asks the technician to explain how he performed the test. He describes how he prepared 3-4 mm thick plates of bitumen and binding agent in the mould and then placed 50 small clean pieces of aggregate on top. After treatment in an oven for 24

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	hours and a 50°C water bath in accordance with the test method, the technician had then carefully pulled out the pieces of aggregate and avoiding any twisting motion. He then estimated the % of bitumen adhering to each of the stones with the expectation that the stripped value would be about 5% (i.e. 95% adhering). The manager is satisfied that the technician has performed the test in accordance with the method and suggested that he now re-run the test with a known aggregate as a control. This test gives a stripped value of 5-7% (i.e. 93-95% adhering). The manager is now sufficiently confident of the laboratory's results to sign and issue the test report and explain the aggregate's 'test failure' to the client.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• calibration and maintenance schedules

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RANGE STATEMENT	
	• enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • MSDS and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • standard operating procedures (SOPs)
Concepts of metrology	Concepts of metrology may include: • that all measurements are estimates • measurements belong to a population of measurements of the measured parameters • repeatability • precision • accuracy • significant figures • sources of error • uncertainty • traceability
Preparation of samples	Preparation of samples may include: • sub-sampling or splitting using procedures, such as riffling, coning and quartering, manual and mechanical splitters • diluting samples • physical treatments, such as ashing, dissolving, filtration, sieving, centrifugation and comminution • moulding, casting or cutting specimens
Typical tests carried out by laboratory/field assistants	Typical tests carried out by laboratory/field assistants may include: • visual/optical tests of appearance, colour, texture, identity, turbidity, refractive index (alcohol content and Baume/Brix) • physical tests: • density, specific gravity and compacted

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RANGE STATEMENT	
	density • moisture content and water activity • particle size, particle shape and size distribution • chemical tests: • gravimetric • colorimetric • electrical conductivity (EC) and pH • specific ions using dipsticks and kits • nutrients (e.g. nitrates and orthophosphates) using basic kits • ashes, including sulphated ashes • biological/environmental tests: • pH, oxygen reduction potential (ORP), dissolved oxygen (DO) and (EC) • E coli using test kits • surface hygiene/presence of microbes • packaging tests: • tearing resistance, bursting strength and impact resistance • permeability and/or leakage • mechanical tests: • Emerson class • concrete slump
Measurements	Measurements may include: • simple ground surveys • meteorological parameters, such as wind direction/strength, rainfall, maximum/minimum temperature, humidity and solar radiation • simple background radiation survey • production/process parameters, such as temperature, flow and pressure • gas levels in a confined space
Common measuring equipment	Common measuring equipment may include: • dimension apparatus • DO and EC • analogue and digital meters and charts/recorders

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RANGE STATEMENT	
	• basic chemical and biological test kits • dipsticks and site test kits (e.g. HACK) • timing devices • temperature measuring devices, such as thermometers and thermocouples
Hazards	Hazards may include: • electric shock • biohazards, such as microbiological organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as sulphuric acid, fluorides and hydrocarbons • aerosols • sharps, broken glassware and hand tools • flammable liquids • dry ice and liquid nitrogen • fluids under pressure • sources of ignition • occupational overuse syndrome, slips, trips and falls • manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects
Enterprise controls to address hazards	Enterprise controls to address hazards may include: • use of MSDS • use of signage, barriers and service isolation tags • use of personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of appropriate equipment, such as biohazard containers and cabinets and laminar flow cabinets • recognising and observing hazard warnings and safety signs

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RANGE STATEMENT	
	• labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of all hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions, and enterprise procedures and regulations • cleaning and decontaminating equipment and work areas regularly using recommended procedures • following established manual handling procedures for tasks involving manual handling
Minimising environmental impacts	Minimising environmental impacts may involve: • recycling of non-hazardous waste, such as chemicals, batteries, plastic, metals and glass • appropriate disposal of hazardous waste • correct disposal of excess sample/test material • correct storage and handling of hazardous chemicals
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL935004A Maintain instruments and equipment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to check the serviceability and calibration of laboratory/field instruments and equipment and perform routine maintenance, such as cleaning and replacement of consumables and minor components. Personnel are also required to perform basic troubleshooting and repairs consistent with warranty and service agreements.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical assistants, instrument operators and technical officers working in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Perform serviceability checks	1.1. Perform pre-/after-use checks in accordance with appropriate enterprise and manufacturer's procedures 1.2. Identify faulty or unsafe components and equipment 1.3. Troubleshoot basic faults or report the need for major maintenance and/or repairs 1.4. Complete instrument/equipment logbooks to enterprise requirements
2. Conduct routine maintenance safely	2.1. Identify maintenance procedures, records and safety requirements 2.2. Plan/adjust maintenance schedules in accordance with operational requirements 2.3. Identify and replace or repair damaged/worn/spent components or items 2.4. Clean equipment and instruments using recommended cleaning agents and techniques 2.5. Store equipment and instruments in accordance with

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ELEMENT	PERFORMANCE CRITERIA
	enterprise/manufacturer's requirements 2.6. Update maintenance records in accordance with enterprise procedures 2.7. Arrange for reordering of consumable stocks and equipment components as necessary
3. Perform calibration/ qualification checks	3.1. Operate equipment/instrument in accordance with enterprise/manufacturer's procedures 3.2. Check calibration/qualification using specified standards and/or procedures 3.3. Record all calibration/qualification data accurately and legibly 3.4. Document calibration status and report out of calibration equipment/instruments 3.5. Quarantine out of calibration items
4. Arrange instrument servicing where appropriate	4.1. Assess instrument repair status, and determine if local repair/maintenance is possible and economical 4.2. Contact and arrange repair/maintenance of equipment from accredited service agent or other appropriate personnel in accordance with enterprise procedures

Required Skills and Knowledge

Required skills
Required skills include: • performing routine maintenance • determining whether an item of equipment/instrument is in correct working order • locating and rectifying basic faults • recognising the need for specialist servicing and/or repairs • conducting calibration status/qualification checks • following all relevant occupational health and safety (OHS) requirements • following enterprise recording and reporting procedures
Required knowledge
Required knowledge includes: • operating principles for equipment/instruments used in routine work • common sources of equipment/instrument faults and their repair

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Required skills
• common errors associated with equipment use • role and importance of regular calibration checks • equipment maintenance schedules and procedures • OHS hazards and control measures • enterprise communication and reporting procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • perform routine maintenance safely • determine whether an item of equipment/instrument is in correct working order • locate and rectify basic faults • recognise the need for specialist servicing and/or repairs • conduct calibration status/qualification checks • obtain instrument/equipment readings with the required accuracy and precision • follow all relevant OHS requirements • follow enterprise recording and reporting procedures.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with relevant: • *relevant MSL974000* series units of competency • *relevant MSL975000* series units of competency. Resources may include: • laboratory equipped with appropriate equipment and calibration standards • SOPs, calibration and maintenance schedules and procedures.

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EVIDENCE GUIDE	
Method of assessment	The following assessment methods are suggested: • review of maintenance records and equipment/instrument logbooks completed by the candidate • observation of the candidate performing serviceability and calibration/qualification checks and routine maintenance • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show their relevance in a workplace setting. **Manufacturing** Starting materials used in manufacturing are often white powders. Infrared spectroscopy is used to positively identify many materials. Two compounds are one and the same if their spectra match in all respects (the position and relative intensity of the absorption bands). For example, if the spectra of a white powder matches the spectra of caffeine, the technician can be sure that the white powder is caffeine, provided that the spectrometer has been correctly maintained and calibrated. The technician routinely checks this using a standard polystyrene film. **Food processing**

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EVIDENCE GUIDE	
	Technicians in a NATA certified laboratory must do regular checks to ensure that laboratory equipment, such as balances, refractometers and spectrometers are calibrated and in working order. Balances are routinely checked using calibrated masses and appropriate documented methods to ensure that they are weighing within the correct tolerances. If the balance is out of specification, the technician follows appropriate procedures to correct this and/or notifies the manufacturer to arrange for the balance to be serviced. **Food processing** A technical assistant in the quality control laboratory of a fruit canning company is required to maintain and operate a range of equipment, including a pH meter. Canned pears, for example, are routinely checked for pH to ensure safe heat processing. While checking the calibration of the pH meter with the standard buffer solutions, the assistant identified that stable pH readings could not be obtained. On closer inspection, they found that the pH probe was damaged and reported the problem to the supervisor. The probe was replaced and the meter was re-checked in readiness for routine testing. **Biomedical** Technical assistants are quite often involved in routine collections and culturing of cells. Bacterial cells are often cultured and grown to large populations in order to provide material from which to extract biological materials. A quick method of determining when the cell growth has yielded enough cells is to determine the absorbance of the cell culture by measuring absorbance at 600 nm. An absorbance of 1 to 1.5 will give a good cell harvest. This method relies on the assistant being able to perform calibration checks on an ultraviolet-visible (UV-VIS) spectrometer.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating

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RANGE STATEMENT	
conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS 2252 Biological safety cabinets
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	• AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4187:2003 Cleaning, disinfecting and sterilising reusable medical and surgical instruments and equipment, and maintenance of associated environments in health care facilities
	• AS/NZS 4501 Set:2008 Occupational clothing set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• Australian Quarantine and Inspection Service (AQIS) Export Control (Orders) Regulations 1982
	• Australian Quarantine and Inspection Service (AQIS) Import Guidelines
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• calibration and maintenance schedules

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RANGE STATEMENT	
	• enterprise recording and reporting procedures • equipment manuals and warranties, supplier catalogues and handbooks • equipment startup, operation and shutdown procedures • gene technology regulations • guide to physical containment levels and facility types • material safety data sheets (MSDS) • material, production and product specifications • National Code of Practice for the labelling of workplace substances (NOHSC:2012 (1994)) • national environment protection measures • National Health and Medical Research Council (NHMRC) Guidelines • national measurement regulations and guidelines • OHS national standards and codes of practice • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals • standard operating procedures (SOPs) • Therapeutic Goods Regulations 1009
Laboratory equipment and instruments	Laboratory equipment and instruments may include: • balances • density bottles, pipettes, burettes and volumetric glassware • thermometers, melting point apparatus, water baths and incubators • optical microscopes, refractometers and polarimeters • conductivity meters and pH meters • ion selective electrodes • autoclaves • mixing and separating equipment, such as centrifuges, rifflers and splitters and mixers • noise meters and blast meters • pressure gauges, torque testers, load cells, strain gauges and tensiometers

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RANGE STATEMENT	
	• disintegration apparatus, penetrometers, hardness testing equipment, viscometers, soil compaction and classification equipment • colorimeters and spectrometers • chromatographic equipment and electrochemical equipment • cell analysers and cell counters • motors, pumps and generators
Basic repairs	Basic repairs may include: • replacement of fuses and reagents and consumables • cleaning and/or replacement of cells, torches and burners • installation, conditioning and removal of columns for gas chromatographs (packed and capillary) and liquid chromatographs (columns and guard columns) • changing injection port ferrules • connecting gas supplies • maintaining syringes/injection equipment • cleaning detectors • appropriate storage of columns and other equipment not currently in use • changing detectors (for gas liquid and liquid chromatographs) • optimising nebulisers • replacement of lamps • realignment of components • replacement of hoses and belts • replacement or top up of oils, lubricants or coolants • basic electrical checks involving simple digital multimeters
Calibration status/qualification checks	Calibration status/qualification checks may include: • matching cells (for dual beam instruments) • checks for monochromator wavelength and photometric accuracy • checks for baseline flatness and stray light • checks on electrode performance • checking sensitivity

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RANGE STATEMENT	
	• injection/use of standard mixtures • comparison with manufacturer's specifications/ chromatogram • use of standard masses and solutions • use of calibrated thermometers and glassware to assess instrument/component performance
Hazards	Hazards may include: • electric shock • chemicals, such as acids and cleaning agents • fluids under pressure, such as steam and industrial gases • sharps, such as broken glassware • sources of heat, such as burners, ovens and furnaces • manual handling of heavy equipment • crushing, entanglement and cuts associated with moving machinery
Safety procedures	Safety procedures may include: • use of personal protective equipment, such as hearing protection, gloves, safety glasses, coveralls and safety boots • ensuring access to service shut-off points • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, enterprise procedures and regulations • following appropriate manual handling procedures • regular cleaning of equipment and work areas • machinery guards • signage, barriers and service isolation tags • lockout and tag-out procedures
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time

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RANGE STATEMENT	
	• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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HLTFA301B Apply first aid

Modification History

Unit Descriptor

This unit of competency describes the skills and knowledge required to provide first aid response, life support, management of casualty(s), the incident and other first aiders, until the arrival of medical or other assistance

Application of the Unit

These skills and knowledge may be applied in a range of situations, including community and workplace settings

Training Package users should ensure implementation is consistent with any specific workplace and/or relevant legislative requirements in relation to first aid, including State/Territory requirements for currency

Application of these skills and knowledge should be contextualised as required to address specific industry, enterprise or workplace requirements and to address specific risks and hazards and associated injuries

A current Senior First Aid, Workplace Level 2 or Level 2 qualification may provide evidence of skills and knowledge required by this competency unit. However, as with all evidence of competence, evidence must be assessed against the requirements specified in the competency unit

Licensing/Regulatory Information

Pre-Requisites

Employability Skills Information

The required outcomes described in this unit of competency contain applicable facets of Employability Skills

The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements

Elements and Performance Criteria Pre-Content

Elements define the essential outcomes of a unit of competency.

The Performance Criteria specify the level of performance required to demonstrate achievement of the Element. Terms in italics are elaborated in the Range Statement.

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Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Assess the situation	1.1 Identify assess and minimise **hazards** in the situation that may pose a risk of injury or illness to self and others
	1.2 Minimise immediate **risk** to self and casualty's health and safety by controlling any hazard in accordance with occupational health and safety requirements
	1.3 Assess casualty and identify injuries, illnesses and conditions
2 Apply first aid procedures	2.1 Calmly provide information to reassure casualty, adopting a communication style to match the casualty's level of consciousness
	2.2 Use available **resources and equipment** to make the casualty as comfortable as possible
	2.3 Respond to the casualty in a culturally aware, sensitive and respectful manner
	2.4 Determine and explain the nature of casualty's injury/condition and relevant first aid procedures to provide comfort
	2.5 Seek consent from casualty prior to applying first aid management
	2.6 Provide **first aid management** in accordance with **established first aid principles** and Australian Resuscitation Council (ARC) Guidelines and/or State/Territory regulations, legislation and policies and industry requirements
	2.7 Seek first aid assistance from others in a timely manner and as appropriate
	2.8 Correctly operate first aid equipment as required for first aid management according to manufacturer/supplier's instructions and local policies and/or procedures

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		2.9	Use safe manual handling techniques as required
		2.10	Monitor **casualty's condition** and respond in accordance with effective first aid principles and procedures
		2.11	Finalise casualty management according to casualty's needs and first aid principles
3	Communicate details of the incident	3.1	Request ambulance support and/or appropriate medical assistance according to relevant circumstances using relevant **communication media and equipment**
		3.2	Accurately convey assessment of casualty's condition and management activities to ambulance services /other emergency services/relieving personnel
		3.3	Prepare reports as appropriate in a timely manner, presenting all relevant facts according to established procedures
		3.4	Accurately record details of casualty's physical condition, changes in conditions, management and response to management in line with established procedures
		3.5	Maintain confidentiality of records and information in line with privacy principles and statutory and/or organisation policies
4	Evaluate own performance	4.1	Seek feedback from **appropriate clinical expert**
		4.2	Recognise the possible psychological impacts on rescuers of involvement in critical incidents
		4.3	Participate in debriefing/evaluation as appropriate to improve future response and address individual needs

Required Skills and Knowledge

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This describes the essential skills and knowledge and their level required for this unit.

Essential knowledge:

ARC Guidelines relating to provision of first aid as outlined

Working knowledge of:

basic principles and concepts underlying the practice of first aid

procedures for dealing with major and minor injury and illness

priorities of management in first aid when dealing with life threatening conditions

basic occupational health and safety requirements in the provision of first aid

infection control principles and procedures, including use of standard precautions

chain of survival

first Aiders' skills and limitations

Understanding of the use of an Automated External Defibrillator (AED), including when to use and when not to

First aid management of:

abdominal injuries

allergic reactions

altered and loss of consciousness

bleeding

burns - thermal, chemical, friction, electrical

cardiac arrest

casualty with no signs of life

chest pain

choking/airway obstruction

injuries: cold and crush injuries; eye and ear injuries; head, neck and spinal injuries; minor skin injuries; needle stick injuries; soft tissue injuries including sprains, strains, dislocations

envenomation - snake, spider, insect and marine bites

environmental impact such as hypothermia, hyperthermia, dehydration, heat stroke

fractures

medical conditions, including cardiac conditions, epilepsy, diabetes, asthma and other respiratory conditions

near drowning

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poisoning and toxic substances (including chemical contamination)

respiratory distress

seizures

shock

stroke

substance misuse - common drugs and alcohol, including illicit drugs

Awareness of stress management techniques and available support

Social/legal issues:

duty of care

need to be culturally aware, sensitive and respectful

importance of debriefing

confidentiality

own skills and limitations

Essential skills:

Ability to:

Conduct an initial casualty assessment

Plan an appropriate first aid response in line with established first aid principles, policies and procedures, ARC Guidelines and/or State/Territory regulations, legislation and policies and industry requirements and respond appropriately to contingencies in line with own skills

Demonstrate correct procedures for performing CPR using a manikin, including standard precautions (i.e. as per unit **HLTCPR201A Perform CPR**)

Apply first aid principles

Infection control, including use of standard precautions

Follow OH&S guidelines

Demonstrate:

safe manual handling

consideration of the welfare of the casualty

ability to call an ambulance

site management to prevent further injury

Provide assistance with self-medication as per subject's own medication regime and in line with State/Territory legislation, regulations and policies and any available

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medical/pharmaceutical instructions

Administer medication in line with state/territory regulations, legislation and policies

Prepare a written incident report or provide information to enable preparation of an incident report

Communicate effectively and assertively in an incident

Make prompt and appropriate decisions relating to managing an incident in the workplace

Call an ambulance and/or medical assistance according to relevant circumstances and report casualty's condition

Use literacy and numeracy skills as required to read, interpret and apply guidelines and protocols

Evaluate own response and identify appropriate improvements where required

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. The evidence guide supplements assessment requirements that apply to all units in this Training Package. Users of this evidence guide should first read the package's assessment guidelines.

Critical aspects of assessment:	Assessment must include demonstrated evidence of specified Essential Knowledge and Essential Skills identified in this competency unit Competence should be demonstrated working individually and, where appropriate, as part of a first aid team Consistency of performance should be demonstrated over the required range of situations relevant to the workplace or community setting Currency of first aid knowledge and skills is to be demonstrated in line with State/Territory regulations, legislation and policies, ARC and industry guidelines

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Context and resources required for assessment:	Skills in performing first aid procedures are to be assessed through demonstration, with questioning to confirm essential knowledge For assessment purposes, demonstration of skills in CPR procedures requires using a model of the human body (resuscitation manikin) in line with Australian Resuscitation Council Guidelines
Access and equity considerations:	All workers in the health industry should be aware of access and equity issues in relation to their own area of work All workers should develop their ability to work in a culturally diverse environment In recognition of particular health issues facing Aboriginal and Torres Strait Islander communities, workers should be aware of cultural, historical and current issues impacting on health of Aboriginal and Torres Strait Islander people Assessors and trainers must take into account relevant access and equity issues, in particular relating to factors impacting on health of Aboriginal and/or Torres Strait Islander clients and communities

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

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Contextualisation to address specific requirements may include:	Focus on first aid management of specific types of injury First aid provision under specific constraints or circumstances (e.g. in confined spaces, in maritime work environment or in work environment involving identified risks/hazards)
Established first aid principles include:	Preserve life Prevent illness, injury and condition(s) becoming worse Promote recovery Protect the unconscious casualty
Vital signs include:	Consciousness Breathing Circulation
A hazard is:	A source or situation with the potential for harm in terms of human injury or ill-health, damage to property, the environment, or a combination of these
Hazards may include:	Physical hazards Biological hazards Chemical hazards Hazards associated with manual handling
Risks may include:	Risks from equipment, machinery and substances Risks from first aid equipment Environmental risks Exposure to blood and other body substances

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Risk of further injury to the casualty

Risks associated with the proximity of other workers and bystanders

Risks from vehicles

Casualty's condition is managed for:

Abdominal injuries

Airway obstruction

Allergic reactions

Altered and loss of consciousness

Bleeding

Burns - thermal, chemical, friction, electrical

Chest pain/cardiac arrest

Injuries: cold and crush injuries; eye and ear injuries; head, neck and spinal injuries; minor skin injuries; needle stick injuries; soft tissue injuries including sprains, strains, dislocations

Near drowning

Envenomation - snake, spider, insect and marine bites

Environmental conditions such as hypothermia, hyperthermia, dehydration, heat stroke

Fractures

Medical conditions, including cardiac conditions, epilepsy, diabetes, asthma and other respiratory conditions

No signs of life

Poisoning and toxic substances (including chemical contamination)

Respiratory distress/arrest

Seizures

Shock

Stroke

Substance misuse - common drugs and alcohol, including illicit drugs.

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First aid management must take into account applicable aspects of:	The setting in which first aid is provided, including: workplace policies and procedures industry/site specific regulations, codes etc. OHS requirements state and territory workplace health and safety legislative requirements location and nature of the incident situational risks associated with, for example, electrical and biological hazards, weather, motor vehicle accidents location of emergency services personnel. The use and availability of first aid equipment and resources Infection control Legal and social responsibilities of first aider
Resources and equipment are used appropriate to the risk to be met and may include:	AED First aid kit Auto-injector Puffer/inhaler Resuscitation mask or barrier Spacer device
Communication media and equipment may include but are not limited to:	Telephones, including landline, mobile and satellite phones HF/VHF radio Flags Flares Two way radio Email

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	Electronic equipment
	Hand signals
Appropriate clinical expert may include:	Supervisor/manager
	Ambulance officer/paramedic
	Other medical/health worker
Documentation may include:	Injury report forms
	Workplace documents as per organisation requirements
Documentation may include recording:	Time
	Location
	Description of injury
	First aid management
	Fluid intake/output, including fluid loss via:
	blood
	vomit
	faeces
	urine
	Administration of medication including:
	time
	date
	person administering
	dose
	Vital signs

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Unit Sector(s)

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CUVPHI05B Use a 35mm SLR camera or digital equivalent

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit describes the skills and knowledge required to apply a range of techniques to the use of a 35mm SLR camera or digital equivalent. It is a specialisation unit and refers to specific techniques for photoimaging. This unit underpins CUVPHI06B Plan and carry out image capture in response to a brief. The work would usually be carried out under supervision.

Current photoimaging industry practice relies increasingly on digital imaging processes and this should be reflected in training and assessment of this unit. Analogue equipment and processes may be used to support this as appropriate to the specific context.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Prerequisite units

It is highly recommended that this unit be assessed in conjunction with the units which cover skills and knowledge for photoimaging developing and printing/outputting work.

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Employability Skills Information

Employability skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 **Operate the camera**.	1.1 Identify and select appropriate camera for specific purposes. 1.2 ***Safely*** operate the camera.
2 **Experiment with techniques to capture photographic images**.	2.1 Identify and select appropriate techniques for the photographic ***subject matter***. 2.2 Identify and select correct lenses and accessories for the photographic subject. 2.3 Select and use appropriate ***controls*** to effect image capture and to ensure correct exposure. 2.4 Test ***techniques*** to achieve changes to subject appearance as required.
3 **Review images**.	3.1 Use ***equipment*** correctly to ***process and output*** the image. 3.2 Evaluate results to ensure correct exposure and the desired outcome for the subject matter. 3.3 Accurately ***document the processes*** and outcomes in accordance with workplace

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ELEMENT	PERFORMANCE CRITERIA
	procedures.
4 **Restore equipment**.	4.1 Clean and ***prepare equipment for storage***, using cleaning ***materials*** safely. 4.2 Store equipment in accordance with workplace procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills:

- literacy skills sufficient to follow instructions for a 35mm SLR camera or digital equivalent
- numeracy skills sufficient to interpret technical charts or diagrams relevant to the use of a 35mm SLR camera or digital equivalent.

Required knowledge:

- general knowledge of the use of a 35mm SLR camera or digital equivalent
- organisational and legislative occupational health and safety procedures in relation to photoimaging work with a 35mm SLR camera or digital equivalent
- general knowledge about other photographers, their work, ideas and techniques
- general knowledge about the elements and principles of design as applied to the use of a 35mm SLR cameras or digital equivalent
- cleaning and maintenance techniques for the use of a 35mm SLR camera or digital equivalent.

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Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit in this unit

The following evidence is critical to the judgement of competence in this unit:

- use of correct processes and techniques to produce images for specific purposes.

Context of and specific resources for assessment

The assessment context must provide for:

- practical demonstration of skills using a 35mm SLR camera or digital equivalent to capture images for specific purposes.

Method of assessment

Assessment may incorporate a range of methods to assess performance and the application of essential underpinning knowledge, and might include:

- direct observation of the candidate using a camera
- evaluation of images captured by the candidate
- oral or written questioning to assess knowledge of camera techniques and features
- discussion and/or written report of the nominated techniques applied to selected subject matter
- written or verbal reports
- review of portfolios of evidence
- third party workplace reports of performance by the candidate.

Assessment methods should closely reflect workplace demands (e.g. literacy) and the needs of particular groups (e.g. people with disabilities and people who may have literacy or numeracy difficulties such as speakers of languages other than English, remote communities and those with interrupted schooling).

Assessment of this unit requires access to the materials, resources and equipment needed to capture

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EVIDENCE GUIDE

images.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. ***Bold italicised*** wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Safely means in accordance with:

- Federal, State and Territory legislation, regulations and standards.

The ***subject matter*** may be:

- portrait
- still life
- the built environment
- the natural environment.

Controls are:

- aperture
- lens focal length
- shutter speed.

Techniques to capture photographic images may relate to:

- aperture:
  - depth of field (maximum and minimum)
  - effect of different lens focal lengths on depth of field
- exposure meter techniques:
  - contrast evaluation
  - incident
  - reflected
  - spot
- perspective:
  - flattened perspective

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RANGE STATEMENT

- normal perspective
- steepened perspective
- shutter speed:
  - freeze motion
  - panning
  - slow shutter speeds and moving subjects
  - time exposure.

Equipment may include:

- cable release
- filters
- lens hoods
- tripod.

Process and output may refer to:

- use of digital image processing and output
- ways photographic film is processed and printed.

Documenting the processes may involve the use of:

- data sheets with notes
- diagrams
- a visual diary.

Preparing equipment for storage may involve:

- cleaning the lens
- use of covers, caps or cases for lens and camera.

Equipment and ***materials*** must include:

- 35mm SLR camera (or digital equivalent)
- film suitable for the nominated techniques black and white, colour or digital media
- lenses covering the focal length range 28mm to 135mm.

Unit Sector(s)

Not Applicable

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PSPRAD707A Monitor radiation

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the ability to safely monitor radiation and the exposure of people and environment during radiation-related work activities. This involves identifying information about the work activities to be monitored, using the specified monitoring equipment, and applying safe working rules and monitoring procedures to obtain reliable results. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit of competency applies to personnel working in radiation-related work activities, including: • extracting, milling, processing and packing radioactive ores • operating, installing, servicing and calibrating fixed radiation gauges, bore hole logging or industrial radiography equipment, and moisture and density gauges • decontaminating and servicing equipment that has been in contact with radioactive material • XRF and XRD analysis • collecting, preparing and testing samples containing radioactive materials • using radionuclides in a laboratory. The activities may take place: • at a mine or plant that processes radioactive ore and minerals • with instruments that emit ionising radiation at

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	geotechnical, construction, mining and manufacturing sites, or analytical and research facilities • in a laboratory or licensed facility that handles radioactive materials • in a nuclear facility. The tasks would be performed under the authority of a responsible person and with the advice of a radiation safety professional, such as a radiation safety officer and in accordance with radiation protection safety standards, codes and guidelines.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA

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ELEMENT	PERFORMANCE CRITERIA
1. **Prepare for assigned monitoring tasks**.	1.1. Use organisation's ***radiation management plans*** to obtain information about the ***hazards*** associated with assigned tasks and the ***monitoring equipment*** and ***safe working rules*** to be used at the site, and refer to ***radiation protection safety standards***, ***codes and guidelines*** if necessary. 1.2. Liaise with relevant site personnel to arrange access and confirm the nature and likely duration of assigned ***monitoring tasks***. 1.3. Perform and record pre-use checks of radiation instruments and tag or replace faulty items as necessary. 1.4. Check that ***personal protective equipment*** (PPE) and other task-related equipment is fit for purpose. 1.5. Stow all radiation instruments and monitoring equipment to ensure safe transport to the site and within the site if required.
2. **Obtain reliable monitoring data or samples**.	2.1. Apply safe working rules to minimise personal ***ionising radiation*** exposure according to relevant radiation protection safety standards, codes and guidelines. 2.2. Operate radiation instruments in accordance with radiation management plans and manufacturer specifications. 2.3. Conduct regular ***instrument checks and minor maintenance*** if required. 2.4. Conduct repeat measurements for quality control purposes in accordance with procedures, and identify and report atypical equipment response. 2.5. Collect and label environmental samples using specified equipment and procedures to preserve their integrity if required. 2.6. Record atypical radiation conditions. 2.7. Seek advice to deal with any situation beyond own technical competence.
3. **Complete assigned monitoring tasks**.	3.1. Check for contamination of equipment. 3.2. Re-stow all radiation instruments and monitoring equipment to ensure safe transport from the site and within the site if required. 3.3. Record use of PPE and radiation instruments in accordance with radiation management plans. 3.4. Before storing PPE, radiation instruments and

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ELEMENT	PERFORMANCE CRITERIA
	monitoring equipment, check their condition in accordance with manufacturer's recommendations and radiation management plan. 3.5. Store any samples to preserve their integrity, security and traceability in accordance with sampling procedures. 3.6. Organise the management of any waste in accordance with organisation's procedures.
4. **Analyse monitoring data and report results**.	4.1. Record results in accordance with procedures. 4.2. Check that recorded outcomes are consistent with expectations. 4.3. Compare results with relevant radiation limits and identify and record any significant differences or atypical results. 4.4. Identify potential or actual radiation protection issues revealed by the site monitoring tasks. 4.5. Identify potential improvements that could be made to monitoring at site. 4.6. Maintain ***required records*** that are complete, accurate, legible and secure. 4.7. Provide site and personal radiation data to authorised personnel if required.
5. **Respond to potential or actual radiation incidents**.	5.1. Recognise unusual situations, unexpected hazards, and potential or actual emergency ***radiation incidents***. 5.2. Inform the responsible person or delegate about the situation, hazard or incident and seek their advice. 5.3. Initiate appropriate workplace emergency first response in accordance with instructions, radiation management plans and organisation's ***response procedures***.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• recognising different types of monitoring equipment, such as air proportional, gas

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REQUIRED SKILLS AND KNOWLEDGE
proportional, gas ionisation, Geiger-Muller, scintillation, neutron monitors, solid state, and personal dosimeters (badge and electronic) • recognising the limitations, restrictions and applicability of these various detector units • using relevant information sources to locate and interpret information about radiation sources and equipment encountered in job role or duties • conducting pre-use checks for radiation instruments and monitoring equipment used in job role or duties • interpreting manuals for radiation monitoring equipment used in job role or duties • collecting, labelling and preserving occupational and environmental samples if required in job role or duties • processing and analysing radiation monitoring data • regularly assessing and reassessing risks and hazards and taking appropriate protective measures • safely operating radiation instruments and monitoring equipment used in job role or duties to obtain reliable data • seeking advice and further directions when faced with unforseen circumstances or situations that may require decisions or response actions beyond technical competence • using and caring for PPE used in job role
Required knowledge

• terms and concepts, such as ionising radiation, radioactivity, radioactive material, activity, dose, contamination, contamination controls, shielding, half-life, and radionuclide
• types and properties of ionising radiation (e.g. alpha, beta, gamma, neutron, x-ray, and electron), sources and shielding methods
• definitions of radiation quantities, such as exposure, dose, effective dose, dose rate, dose equivalent, and dose limits
• international system (SI) of units for radiation quantities, multiples and sub-multiples
• function of key components and operating principles of radiation instruments and monitoring equipment used in job role
• guidelines and safety procedures for working with radiation sources, based on principles of:
  • reducing exposure time
  • maintaining greatest distance
  • using as much shielding as possible
• health, safety and workplace emergency response procedures relevant to job role or duties
• techniques and procedures for collecting potentially radioactive samples, if required in job role or duties
• techniques for assessing radiation hazards likely to be encountered in job role or

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REQUIRED SKILLS AND KNOWLEDGE
duties • techniques for conducting monitoring surveys used in job role or duties

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessment must confirm the ability to: • work safely in a radiation environment • detect ionising radiation and contamination • obtain reliable data and samples to quantify radiation and contamination • process radiation data and report results • keep accurate and complete records relevant to job role or duties. **Consistency in performance** Competency should be demonstrated by safely undertaking a variety of radiation monitoring tasks involving the use of appropriate radiation monitoring equipment.
Context of and specific resources for assessment	Competency should be assessed in the workplace or a simulated workplace environment. Assessment must comply with: • local regulations regarding the registration of operators, premises and sources at workplaces where radioactive materials and/or ionising radiation equipment are present • organisation's radiation management plan • manufacturer's instructions for operating radiation monitoring equipment. Access may be required to: • registered premises and sources • supervision by a radiation safety professional • radiation instruments and monitoring equipment

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EVIDENCE GUIDE	
	• appropriate PPE • radiation management plan or procedures.

Method of assessment	The following assessment methods are suggested:
	• oral/written tests and calculations involving:
	  • radiation terms, principles and quantities
	  • set-up, calibration and basic maintenance of radiation instruments
	  • selection and use of PPE
	• analysis of monitoring case studies and reports
	• review of radiation data, results and records generated by the candidate
	• feedback from peers and supervisor that the candidate consistently applies relevant radiation protection and safety requirements
	• observation of the candidate:
	  • using and caring for PPE
	  • using radiation instruments and monitoring equipment
	  • undertaking a variety of tasks in a simulated radiation environment.
	In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency that are difficult to assess directly.

Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Radiation management plans should include details of:	• work practices, such as safe working rules and emergency response procedures • roles and responsibilities of personnel

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	• radiation monitoring requirements • control of an incident involving a source • storage of a source • accountability and records • other requirements that may have a bearing on safety.
Hazards may include:	• inhalation of radioactive dust or gas • ingestion of radioactive dust or contaminated food or water • unexpected exposure to sealed or unsealed radiation sources or partially enclosed equipment that emits ionising radiation.

Monitoring equipment may include:	• radiation instruments and survey meters, such as:
	  • air proportional (alpha)
	  • gas proportional (alpha, beta)
	  • gas ionisation (gamma)
	  • Geiger-Muller (beta, gamma)
	  • ionisation (beta)
	  • scintillation (alpha, beta, gamma)
	  • solid state (alpha, gamma)
	• wipe test equipment
	• sample containers, shovels, augers, buckets, air/water pumps, and stainless steel bailers.

Safe working rules will vary according to the type of source equipment and should include monitoring details, such as:	• for example, RPS No.13 Code of Practice and Safety Guide for Safe Use of Fixed Radiation Gauges (2007), which specifies that working rules include details of:
	  • expected radiation levels around each fixed radiation gauge under the control of the responsible person
	  • tests for non-fixed surface contamination where appropriate
	  • occasions on which radiation surveys and contamination tests will be carried out
	  • methods for conducting radiation surveys, wipe tests and other examinations required by the code, and for reporting and recording results
	  • types and occasions for use of personal monitoring devices.

Radiation protection safety standards, ***codes and guidelines*** may include:	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) radiation protection series publications, such as: • RPS No.1 Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing

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	Radiation (republished 2002) • RPS No.7 Recommendations for Intervention in Emergency Situations Involving Radiation Exposure (2004) • RPS No.6 National Directory for Radiation Protection, (December 2009) • RPS No.9 Code of Practice and Safety Guide for Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing (2005) • RPS No.15 Safety Guide for the Management of Naturally Occurring Radioactive Material (NORM) (2008) • requirements of commonwealth, state and territory radiation protection and safety legislation • definition of a responsible person • Australian standards.
Monitoring tasks may include:	• observation of personnel conducting work activities in controlled radiation areas • surveys and measurements for: • establishing background levels • identifying areas of elevated activity and possible contamination • identifying and quantifying radiation contamination at specified locations • locating discrete radiation sources • assessing integrity of packaging or shielding • determining the effectiveness of decontamination • locating contamination on personnel and equipment • verifying contamination control boundaries • collection of air, water, soil, plant and animal specimens to monitor contamination.
Personal protective equipment may include:	• gloves, over-boots, safety hats, goggles, face masks, overalls and gowns • respirators or HEPA filter masks.

Ionising radiation may include:	• x-rays, electrons, neutrons, gamma rays, beta particles and alpha particles emitted from radioactive materials, including sealed and unsealed sources • neutrons emitted from generator tubes • x-rays generated by industrial radiography equipment, XRF and XRD instruments.

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Instrument checks and minor maintenance may include:	• battery changes • calibration checks • zero checks.
Required records may include details of:	• approvals and authorisations granted by the appropriate authority • specifications of the radiation management plan and monitoring program • estimates of doses received by employees and by members of the public • health records of personnel and individual monitoring data • environmental radiation measurements • calibration, inspection and maintenance of radiation instruments and equipment • transport of radioactive sources • shipment of radioactive ores • radioactive waste disposal • procurement and disposal of radioactive sources • incidents and accidents involving exposure to radiation and corrective measures taken.

Radiation incidents may include:	• exposure of unauthorised personnel entering a controlled area
	• personal exposure above statutory exposure limits and a monitoring result in excess of statutory derived levels of exposure
	• exposure from an uncontrolled, high hazard radioactive sealed source that:
	  • has loss or destruction of shielding
	  • is involved in a transport accident
	  • is lost, missing or stolen
	  • has a malfunction of its shutter or interlocks
	  • has been dropped during removal from its container
	  • has jammed in an unsafe position
	• exposure from equipment that emits ionising radiation and has:
	  • loss or destruction of shielding
	  • malfunction of its shutter or interlocks
	• exposure from dispersed radioactive material caused by:
	  • leakage or radioactive contamination
	  • industrial or laboratory accident
	  • uncontrolled releases of radioactive materials from a mine site, such as dust or contaminated water

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	• dispersion of contaminants following destruction of a high activity sealed source.
Response procedures will include:	• instructions for keeping exposures to a minimum, consistent with essential operations through evacuation or otherwise • instructions for notifying the relevant competent authority if required.

Unit Sector(s)

Not applicable.

Competency field

Competency field	Radiation Safety

Co-requisite units

Co-requisite units	

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PRMWM02B Carry out waste audit

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency describes the audit of a client's waste characteristics. It requires the ability to identify and assess company/client waste practices and issues that impact upon their operations.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Not Applicable

Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Prepare for audit	1.1 Review *audit plan* to determine job requirements 1.2 Obtain the *equipment required* to conduct the audit plan 1.3 Identify and follow *details relating to access*

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ELEMENT	PERFORMANCE CRITERIA
	to site and site requirements in accordance with job requirements
	1.4 Assess audit site for hazards and advise appropriate personnel according to audit plan
	1.5 Set up audit *site* to ensure safe and accurate data collection in accordance with audit plan, site requirements and relevant legislation
	1.6 Pre-check appropriate *personal protective equipment* for operability
	1.7 Utilise appropriate personal protective equipment in accordance with job requirements, *manufacturers' specifications*, *company requirements*, OHS and other relevant legislation
	1.8 Identify and manage *potential job requirement risks and hazards* in accordance with company requirements, OHS and other relevant legislation
2 Conduct audit	2.1 Conduct waste audit in accordance with audit plan, OHS and other relevant legislation
	2.2 Isolate waste stream to allow accurate audit in accordance with waste audit plan requirements
	2.3 Identify, sort, *measure* and record waste accurately to ensure validity of data collection
	2.4 Identify *unanticipated waste* and include in data collection
	2.5 At completion of audit, remove waste, pack equipment and restore site to previous condition in accordance with audit plan and company requirements
	2.6 Issue and collect audit material such as waste management survey from designated persons in accordance with waste audit requirements
3 Document audit findings	3.1 Collect, compile and tabulate audit data and provide to *relevant personnel*
	3.2 Document all waste *audit activity details* in accordance with audit plan and company requirements

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Required Skills and Knowledge

Refer to Evidence Guide

Evidence Guide

EVIDENCE GUIDE

Critical aspects of competency

- Identify, sort, measure and record wastes.
- Identify unanticipated waste.
- Conduct an accurate and valid waste audit.

Knowledge needed to achieve the performance criteria

Knowledge and understanding are essential to apply this unit in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below.

- Common reasons for undertaking a waste audit standard.
- Audit requirements and procedures.
- Waste types.
- Streams and characteristics.
- Measurements including weights and volumes.
- Sampling techniques.
- Recording techniques.
- Company requirements.
- Potential risks and hazards in waste audit.
- Emergency response procedures.
- occupational health and safety requirements.
- Duty of care in provision of services.
- Relevant industry standards.
- Relevant legislation.
- Relevant environmental regulations.
- OHS hierarchy of control.

Specific skills needed to achieve the performance criteria

To achieve the performance criteria, some complementary skills are required. These are:

- oral communication skills including questioning, listening, following instructions
- reading and interpreting skills
- written communication skills for documentation and report writing
- methodical organisation of work
- identification of waste types
- streams and characteristics recognition of unanticipated waste types
- using recording equipment
- using photographic equipment

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- accuracy and attention to detail
- computer skills
- using communications equipment (two-way radio and mobile phone)
- estimating
- hazard identification
- use of emergency and personal protective equipment
- safe and efficient work practices.

Resources required to assess this unit

The following resources should be available:

- waste audit plan in a workplace
- portfolio case studies if required
- audit resources (including camera equipment).

Gaining evidence to assess this unit

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and be observed by the assessor (or assessment team working together to conduct the assessment). The competency is to be demonstrated in a range of situations, which may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Evidence of competency is best obtained by observing activities in the relevant environment and by carrying out waste audit under normal industry operating conditions. If this is not practicable, observations in realistic simulated environments may be substituted

Consistency in performance

Audit requires that strategies meet the objectives of clients and comply with industry expectations in the particular client environment. If the environment is narrowly defined or is not representative of industry needs, it will be necessary to assess the unit within a variety of waste management environments or different client needs to assess competency in the development of waste management strategies.

Oral questioning or written audit and hypothetical situations (scenarios) may be used to assess underpinning knowledge. (In audit situations where the candidate is offered a preference between oral questioning and written audit, questions are to be identical.)

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

Note: All practical demonstrations must adhere to the safety and environmental regulations relevant to each state or territory.

Key competency levels

There are a number of processes that are learnt throughout work and life which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the key competencies, although others may be added.

Information below highlights how these processes are applied in this competency standard.

1 Perform the process **2** Perform and administer **3** Perform, administer and

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	the process	design the process
How can **communication of ideas and information** be applied?	**2**	Discuss audit plans with clients and colleagues.
How can **information be collected**, **analysed and organised**?	**2**	Gather information from a number of sources (including regulatory sources, relevant personnel and company specifications) about carrying out a waste audit.
How are **activities planned and organised**?	**1**	Plan appropriately for waste audit.
How can **teamwork** be applied?	**1**	Conduct discussions with clients and/or colleagues during client contact.
How can the use of **mathematical ideas and techniques** be applied?	**1**	Conduct mathematical calculations for waste audit plan.
How can **problem-solving skills** be applied?	**1**	Alleviate client concerns throughout the waste management audit while observing company requirements.
How can the **use of technology** be applied?	**1**	Demonstrate understanding of technological principles and physical skills to use appropriate equipment.

Range Statement

RANGE STATEMENT

The range statement links the required knowledge and organisational and technical requirements to the workplace context. It describes any contextual variables that will be used or encountered when applying the competency in work situations. It allows for different work practices and work and knowledge requirements as well as for differences between organisations and workplaces. The following variables may be present for this particular unit.

Audit activity details should include:

- accidents/injuries
- date
- equipment used
- location

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- results/findings
- time
- waste disposal.

Audit plan may include but is not limited to:

- collection of photographic evidence
- measurement and recording requirements
- OHS requirements
- personnel and equipment requirements including personal protective equipment
- sample requirements
- site contacts
- site requirements.

Company/**client** includes all forms of business enterprises in this context including government agencies, local governments/councils, private and public companies and residents/ratepayers.

Client requirements are found in briefing documents, letters, quality assurance documents, tender/contract documents and verbal or written instructions.

Details relating to access to site and site requirements include but are not limited to:

- access and egress points
- occupational health and safety requirements and noise control
- personal protective equipment
- security clearance
- time of access
- union requirements
- work permits.

Emergency and personal protective equipment must include:

- appropriate footwear
- communications equipment
- eye protection
- eyewash kit
- fire extinguishers
- First Aid kit
- gloves
- overalls and protective clothing.

Emergency and personal protective equipment could also include:

- breathing apparatus
- emergency procedure guides
- face shield/mask
- goggles/protective glasses
- hard hat
- hearing protection

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- material safety data sheets
- spill kit.

Equipment required includes:

- absorbent material
- bunding equipment
- camera
- collection containers
- lifting gear
- measurement equipment
- personal protective equipment
- reference manuals
- safety barriers and warning signs
- sample bench
- scales.

Manufacturers' specifications are found in equipment specifications and operator manuals.

Measurement of waste should include number, proportion/percentage, volume and weight.

Performance of this unit is carried out in accordance with relevant requirements of the following:

- Australian Standards
- environmental regulations
- legislative requirements
- manufacturers' specifications
- OHS regulations
- organisational procedures
- relevant state/territory regulations.

Potential job requirement risks and hazards include but are not limited to:

- contamination
- dust
- fire
- gases and fumes
- hazardous waste (e.g. sharps)
- inadequately contained waste
- injuries resulting from manual handling and repetitive work
- other vehicles and equipment
- projectiles
- spark-producing equipment
- weather.

Relevant personnel include but are not limited to client, householder, management and waste generator's personnel.

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Site may include business premises, landfill site, local government area, plant/factory and waste processing plant.

Unanticipated waste includes any waste stream not expected to be present within the sample.

Unit Sector(s)

Not Applicable

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PRMWM01B Plan waste audit

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency describes the planning and organising of an audit of a client's waste characteristics. It requires the ability to interpret and follow assignment instructions and liaise effectively with clients.

Application of the Unit

Not Applicable

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Not Applicable

Employability Skills Information

Not Applicable

Elements and Performance Criteria Pre-Content

Not Applicable

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Determine audit objectives	1.1 Consult *client* to determine *waste audit requirements*/*purpose* 1.2 Review waste audit objectives to ensure they are realistic and achievable 1.3 Document and confirm waste audit objectives

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ELEMENT	PERFORMANCE CRITERIA
	with the client
2 Scope waste audit site	2.1 Obtain all *information relating to site and client operations* from relevant personnel to determine appropriate *audit methodology*
	2.2 Assess the waste generation *site* to determine *waste characteristics*, disposal and recovery routes
	2.3 Assess the waste generation site to determine hazards and risks and report to designated personnel
3 Plan audit	3.1 Take into consideration *client* requirements and sampling requirements necessary to audit methodology - valid and representative audit data
	3.2 Determine suitable date, time and duration of audit to obtain valid and representative audit data and minimise client disruption
	3.3 Incorporate details relating to access to site and specific site requirements into audit plan
	3.4 Identify necessary *personnel* and *equipment requirements* to ensure effective, safe and efficient audit operations. This may include the services of relevant experts where advanced sampling or testing is required
	3.5 Obtain full support and written authorisation from the client to proceed with waste audit in accordance with company requirements, appropriate legislation and safety procedures
	3.6 Identify, confirm and follow client confidentiality arrangements in accordance with client and company requirements and relevant legislation
4 Document audit plan	4.1 Document audit plan accurately with all necessary details to effectively conduct a waste audit
	4.2 Complete and process other relevant documentation, such as *waste management survey* in accordance with assignment instructions
	4.3 Obtain written approval for waste audit from the client in accordance with company requirements

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Required Skills and Knowledge

Refer to Evidence Guide

Evidence Guide

EVIDENCE GUIDE

Critical aspects of competency

- Ability to determine a variety of audit objectives.
- Effective consultation with client to obtain information and support for audit strategy.
- Ability to thoroughly scope waste audit site.

Knowledge needed to achieve the performance criteria

Knowledge and understanding are essential to apply this unit in the workplace, to transfer the skills to other contexts, and to deal with unplanned events. The knowledge requirements for this unit are listed below.

- Common reasons for undertaking a waste audit.
- Nature and significance of waste minimisation hierarchy.
- Waste types, streams and characteristics.
- Waste disposal and recovery routes.
- Waste audit plans.
- Waste analytical methods.
- Standards audit requirements and procedures.
- Types of client waste management surveys and their uses.
- Sampling techniques.
- Client requirements.
- OHS requirements.
- Duty of care in provision of services.
- Relevant industry standards.
- Relevant legislation.
- Relevant environmental regulations.
- OHS hierarchy of control.

Specific skills needed to achieve the performance criteria

To achieve the performance criteria, some complementary skills are required. These are:

- sound oral communication skills including questioning, listening, liaison and consultation
- sound written communication skills for report writing and developing surveys
- reading and interpreting maps, plans and documents
- methodical organisation of work
- site scoping
- audit planning

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- computer skills
- safe and efficient work practices
- ability to apply appropriate decision-making techniques.

Other units of competency that could be assessed with this unit

This unit could be assessed on its own or in combination with other competencies relevant to the job function, for example:

- PRMWM02B Carry out waste audit
- PRMWM03B Review, evaluate and document waste assessment findings.

Resources required to assess this unit

The following resources should be available:

- client audit requirements for workplace portfolio case studies if required
- work plans and approved specifications
- results of sampling
- forms and procedure manuals
- surveys, reports.

Gaining evidence to assess this unit

For valid and reliable assessment of this unit, the competency should be demonstrated over a period of time and be observed by the assessor (or assessment team working together to conduct the assessment). The competency is to be demonstrated in a range of situations, which may include customer/workplace interruptions and involvement in related activities normally experienced in the workplace.

Evidence of competency is best obtained by observing activities in the relevant environment and reviewing the planning of a waste audit under normal industry operating conditions. If this is not practicable, observations in realistic simulated environments may be substituted.

Consistency in performance

Audit requires that the plan meets the objectives of the client and that it complies with industry expectations in the particular client environment. If the environment is narrowly defined or is not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of waste requirements to assess competency in audit of waste plans.

Oral questioning or written audit and hypothetical situations (scenarios) may be used to assess underpinning knowledge. (In audit situations where the candidate is offered a preference between oral questioning and written audit, questions are to be identical.)

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

Note: All practical demonstrations must adhere to the safety and environmental regulations relevant to each state or territory.

Key competency levels

There are a number of processes that are learnt throughout work and life which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the key competencies, although others may be added.

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Information below highlights how these processes are applied in this competency standard.

1 Perform the process **2** Perform and administer the process **3** Perform, administer and design the process

How can **communication of ideas and information** be applied?	**2**	Discuss with clients and colleagues and demonstrate physically, appropriate use of waste audit methods.
How can **information be collected**, **analysed and organised**?	**3**	Gather information from a number of sources (including regulatory sources and company specifications) about waste audit methods for accurate demonstrations to occur.
How are **activities planned and organised**?	**3**	Plan in detail throughout audit, scoping of site, selecting audit methodology and developing waste management survey.
How can **teamwork** be applied?	**1**	Discuss with clients and/or colleagues throughout consultations.
How can the use of **mathematical ideas and techniques** be applied?	**2**	Compile survey results in specified manner which may include percentages.
How can **problem-solving skills** be applied?	**1**	Discuss with clients their concerns throughout the waste audit processes while observing company requirements.
How can the **use of technology** be applied?	**1**	Demonstrate understanding of technological principles and physical skills to use appropriate equipment.

Range Statement

RANGE STATEMENT

The range statement links the required knowledge and organisational and technical requirements to the workplace context. It describes any contextual variables that will be used or encountered when applying the competency in work situations. It allows for different work practices and work and knowledge requirements as well as for differences between organisations and workplaces. The following variables may be present for this particular unit.

Audit methodology includes:

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- audit scope
- client waste management survey
- determining sort categories
- elimination of other variables
- isolation of waste streams
- method of recording information
- sample required.

Client includes all forms of business enterprises in this context including government agencies, internal customers, local governments/councils, private and public companies, and residents/ratepayers

Client requirements are found in briefing papers, letters from client, quality assurance documents, tender/contract documents and verbal or written instructions

Equipment requirements include:

- absorbent material
- bunding equipment
- camera
- collection containers
- lifting gear
- measurement equipment
- personal protective equipment
- reference manuals
- safety barriers and warning signs
- sample bench
- scales.

Guidelines on use of waste management survey:

- develop appropriate survey questions in accordance with the waste audit objectives
- ensure survey questions are able to be completed within the time allowed by the client
- obtain client authorisation for survey in accordance with company requirements
- write clear survey instructions and questions for the target group.

Information relating to site and client operations must include:

- access to site and specific site requirements
- locations of waste containers
- map of plant/site
- processing methods
- production dates and schedules
- production inputs and outputs
- site size
- storage and disposal methods
- waste handling
- waste hazards

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- waste outputs
- waste recovery routes
- waste streams.

Performance of this unit is carried out in accordance with relevant requirements of the following:

- Australian Standards
- environmental regulations
- legislative requirements
- manufacturers' specifications
- OHS regulations
- organisational procedures
- relevant state/territory regulations.

Personal protective equipment may include:

- breathing apparatus
- gloves
- goggles/safety glasses
- overalls
- protective headwear
- safety shoes.

Personnel requirements include licences required, skills of personnel and training/briefing.

Site may include business premises, landfill site, local government area, plant/factory and waste processing plant.

Waste audit requirements/purpose may include but are not limited to:

- cost reductions
- develop waste management plan
- environmental concerns
- identify recyclable waste
- identify waste management policy
- identify waste streams
- process review
- review implementation of waste management plan
- waste minimisation.

Waste characteristics include but are not limited to:

- building material
- chemicals
- general garbage
- household waste
- industrial
- medical
- metal

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- paper.

Waste management survey could typically include checklist, focus group, questionnaire and survey.

Waste site purpose includes but is not limited to:

- contamination
- dangerous and hazardous wastes
- disposal methods
- production of waste
- recycling
- re-use
- waste generation
- waste streams
- waste types.
-

Unit Sector(s)

Not Applicable

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MSL975023A Supervise geotechnical site investigations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to supervise and direct geotechnical site investigations based on observation and testing. The unit involves confirming the scope of the investigation, liaising with site personnel and coordinating geotechnical sampling and testing activities, collecting reliable data and reporting results. Personnel are also expected to interpret results in the field, provide reliable advice to clients, recognise and rectify obvious errors or unexpected results and troubleshoot common problems.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical officers working in the construction materials testing sector. This unit of competency is typically performed by experienced technicians or engineering paraprofessionals, who often supervise or direct less experienced technical personnel. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		
	MSL974002A	*Conduct geotechnical site investigations*
	MSL973012A	*Assist with geotechnical site investigations*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Plan geotechnical investigation	1.1. Identify the job, consult with stakeholders and obtain relevant information, including the purpose and scope of the investigation 1.2. Conduct desktop study of existing site information 1.3. Inspect the site to determine the characteristics of the project 1.4. Design inspection, sampling and testing program in accordance with specifications 1.5. Select human and physical resources required for the job 1.6. Identify site hazards and conduct risk assessment 1.7. Organise site induction for support personnel, as

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ELEMENT	PERFORMANCE CRITERIA
	required 1.8. Brief support personnel on job-specific requirements 1.9. Ensuring ongoing liaison with stakeholders during project
2. Establish on-site operations	2.1. Consult with project personnel to determine methods of communication, roles, responsibilities and expectations of each party, including identification of potential problems and conflicts 2.2. Arrange deployment of personnel and resources to site 2.3. Arrange for the physical location of services, as required, and reconcile test locations
3. Coordinate geotechnical sampling and testing	3.1. Ensure sampling and testing is conducted in accordance with project requirements 3.2. Ensure test data and observations are recorded in accordance with enterprise practices 3.3. Review the progress of sampling and testing against the project schedule and provide any feedback to client as required 3.4. Review samples and field data and schedule testing as required 3.5. Ensure the finalisation of site operations according to project brief or relevant standard
4. Analyse project data and report to client	4.1. Report test results to site superintendent at specified intervals 4.2. Analyse project data and provide regular reports to the client using the agreed format
5. Maintain enterprise records	5.1. Ensure site results are documented in accordance with enterprise practices 5.2. Maintain security and confidentiality of enterprise information 5.3. Prepare and issue a final project report in accordance with client requirements
6. Promote a safe work environment	6.1. Promote the use of safe work procedures and protective equipment 6.2. Minimise environmental impacts of testing/sampling and generation of waste 6.3. Promote the collection and disposal of all waste in accordance with enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting maps, site plans and drawings
- planning and managing projects
- identifying and locating site services, sampling and testing sites (e.g. using global positioning system (GPS))
- identifying soil, rock and fill materials
- observing, interpreting and reportingsite features and geotechnical conditions
- maintaining accurate and complete records
- interpreting test data
- resolving problems appropriately
- seeking advice about problems beyond technical competence from appropriate personnel
- driving safely on- and off-road
- working safely on construction sites aroundheavy equipment and earthmoving plant
- report writing
- using computer software to create/maintain databases and produce detailed reports

Required knowledge

Required knowledge includes:

- the purposes and principles of geotechnical site investigation
- identification and classification of materials
- principles of planning and project management
- engineering properties of soil and rock materials
- representative sampling and testing (both in situ and laboratory)
- uses of engineering materials in civil construction
- civil construction techniques
- relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the

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EVIDENCE GUIDE	
performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • liaise with stakeholders at various levels of complexity • plan, coordinate and monitor a diverse range of geotechnical activities • analyse, collate and report geotechnical investigation findings.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used. This unit of competency may be assessed with: • *MSL915001A Provide information to customers* • *MSL915002ASchedule laboratory work for a small team* • *MSL935001A Monitor the quality of test results and data*. Resources may include: • access to sites, tools and equipment • enterprise procedures, sampling plans, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • examples of completed workplace documentation • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made

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EVIDENCE GUIDE	
	to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials testing** The materials laboratory of a large local authority has been requested to investigate a 10 km section of road pavement that shows varying degrees of distress. As the road is to be rebuilt and upgraded, the supervising engineer requires information to identify the reasons for the distress and to inform the design of the new pavement. The investigation will require test pits at 500 m intervals to allow examination of the underlying strata, in situ testing and sampling of existing pavement and sub-grade materials. The work will be performed by an experienced technician and a testing assistant, with supervision by a senior technician. The Council's Works Department will provide a backhoe with an operator and traffic management team. The engineer briefs the senior technician on the scope, purpose and requirements of the investigation and provides himher/ with the available documentation including maps, drawings and previous reports on the project. They refer to relevant ARMIS data, Falling Weight Deflection testing and surface defect mapping data. They carry out an on-site reconnaissance to confirm the available data and initial assumptions. The senior technician conducts a desk study to ensure that he/she understands the full requirements of the project. He/she plans the on- and off-site activities including locating the relevant services and utilities, arranging for the necessary permits and preparing a health and safety management plan. He/she also plans the excavations, sampling and in situ testing and the

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	laboratory testing regime. Finally, he/she prepares a GANTT chart showing all activities and the critical control points. The project is expected to take one week to complete. He/she conducts a briefing session with the relevant stakeholders to nominate job roles and explain the required timelines. The scope of testing requires coring of UCS samples, cutting of asphalt slabs for MATTA testing, Material Quality testing (i.e. gradings, atterbergs and CBR's) as well as in situ DCP and moisture content testing. PAVSET data is also to be collected onsite. On completion of the field activities, the senior technician checks the samples and then, if required, adjusts the testing schedule so as to capture enough relevant test data. Once all required testing has been completed and checked, the senior technician collates the test data and summarises it into a report for the project engineer. He/she then meets with the engineer who, after reviewing the report, finds that a 1 km section of the road needs further sampling and testing because this section is in a known flood plain. The engineer issues a new test request specifying that this section of road requires a sample and test pit every 100 m. Previously collected data is to be collated with these new samples. The senior technician then organises for the added sampling and testing to be included into the laboratory's work schedule, mindful of any new time constraints. After completing the additional testing, he/she collates all the data into a final report for the engineer.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of

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RANGE STATEMENT	
	practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• environmental legislation and regulations
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• industry codes of practice
	• laboratory schedules
	• material, production and product specifications
	• National Association of Testing Authorities (NATA) documents regarding construction materials testing
	• occupational health and safety (OHS) national standards and codes of practice
	• production and laboratory schedules
	• project management methodology
	• quality manuals
	• standard operating procedures (SOPs)

Site hazards may include:	Site hazards may include: • solar radiation, dust and noise • manual handling of heavy materials and equipment • working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes • vehicular and pedestrian traffic

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RANGE STATEMENT	
Safety procedures	Safety procedures may include: • location of site services before investigations commence • use of material safety data sheets (MSDS) • use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls, safety boots and high visibility clothing • handling, and storage of hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, enterprise procedures and regulations • regular cleaning of equipment and vehicles • machinery guards • signage, barriers, flashing lights and traffic control
Tools and equipment	Tools and equipment may include: • excavation equipment, hand and power augers • consumables, including sample bags and labels • documentation, including maps, plans, contract documents and worksheets • field test equipment, including sand replacement apparatus and dynamic cone penetrometer • still/video camera • communication equipment, such as two-way radio and mobile telephone • levelling equipment (dumpy and automatic levels)
Common site problems	Common site problems may include: • caving of the excavation • drilling difficulties • not knowing the requirements of the design engineer • not understanding the nature of the item being designed (e.g. retaining wall, piled structure and earthworks) • sample loss during retrieval • knowing when to stop a hole, or what and when to test and sample • misidentification of samples and sampling

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RANGE STATEMENT	
	locations • equipment breakdown and breakage • environmental problems and issues, including site access, inclement weather, traffic, wildlife, vegetation and construction activities
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL975017A Perform laboratory-based ecological techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to participate in laboratory investigations involving animals, plants and related environmental parameters. The animals or plants might be single specimens, parts of specimens or be in culture or under propagation. The investigations might also be part of experimental models that examine interactions of animals and/or plants and their environments. Investigations would generally relate to taxonomy, physiology and pathology, and would be oriented to scientific research, food production and manufacture, and to investigation of biological environments and ecosystems.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians and technical officers working in biological, biotechnology and environmental industry sectors. It is expected that all work would conform to statutory and enterprise occupational health and safety (OHS) codes of practice. This unit of competency assumes that the worker would perform tests and procedures under the close supervision of scientific staff and that the enterprise will equip its workers with relevant animal handling skills should such be required. The unit does not cover procedures related to the handling of vertebrates that are subject to national and state/territory animal care and ethics regulations. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in

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	practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MSL974006A	*Perform biological procedures*
	MSL973007A	*Perform microscopic examination*
	MSL973004A	*Perform aseptic techniques*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**

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ELEMENT	PERFORMANCE CRITERIA
1. Process specimens and documentation	1.1. Check specimens and request forms for labelling and documentation before acceptance 1.2. Log specimens, applying required document tracking mechanisms 1.3. Dispatch specimens to referral laboratories as required 1.4. Store specimens appropriately until required for testing
2. Participate in the identification and classification of species	2.1. Record macroscopic and/or microscopic details of specimens to assist in their identification and classification 2.2. Use taxonomic keys to assist in the identification and classification of species 2.3. Perform laboratory analyses that can assist in identification and classification of species 2.4. Preserve specimens for future reference 2.5. Label preserved specimens for storage and reliable retrieval from collections
3. Maintain viability and integrity of specimens during experimentation	3.1. Provide nutrients and environments to maintain viability of individual specimens and organisms being cultured or propagated 3.2. Perform procedures and analyses to monitor the experimental environment 3.3. Perform procedures and analyses to monitor the physiology of organisms in the experimental environment 3.4. Adjust nutrient requirements and environmental conditions as indicated by monitoring data 3.5. Report to supervisors data and phenomena that may risk viability of individual specimens or cultures 3.6. Report to supervisors data and phenomena that are incompatible with the experimental design parameters
4. Integrate laboratory and field data	4.1. Locate field data relevant to the study or experiment 4.2. Ensure that field and laboratory data codes are matched for tracking, reporting and chain of custody requirements 4.3. Log field and laboratory data into information systems 4.4. Assist with writing reports of experiments and related field studies

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ELEMENT	PERFORMANCE CRITERIA
5. Maintain a safe work environment	5.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 5.2. Minimise the generation of wastes and environmental impacts 5.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 5.4. Care for and store equipment and reagents as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skill include:

- communicating scientific and technical concepts and terminology accurately to supervisors, peers and clients
- maintaining the viability of specimens
- identifying and classifying species
- taking representative samples for analysis
- relating field and laboratory data for the generation of meaningful results
- working safely for the protection of self and co-workers
- disposing of wastes carefully for the protection of those who may handle and process wastes and to minimise contamination of the environment

Required knowledge

Required knowledge includes:

- growth requirements of organisms that are subjects of laboratory or greenhouse culture or propagation
- general anatomy of plants and animals that is useful as classification data
- processes that are essential for preservation of plant and animal material for use as reference material
- relationships between field and laboratory data that are useful in giving commentary on the integrity or distress in biological environments
- rationale for selection of techniques used to monitor the experimental environment and the effects of variables on organisms in the experimental environment

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REQUIRED SKILLS AND KNOWLEDGE
• uses of environmental impact statements that incorporate the results of field and laboratory analyses • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • relate field and laboratory data for the generation of meaningful results • identify and classify animal and plantspecies for scientific and experimental purposes • maintain the viability of species during experimentation • monitor the physiology and interactions of plants and animals and their environments • take representative samples for analysis • work safely for the protection of self and co-workers • communicate appropriately with customers and be aware of cultural and social contexts • not contaminate sterile environments or specimens • dispose of wastes carefully for the protection of those who may handle and process wastes and to minimise contamination of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL925001A Analyse data and report results* • *MSL974007AUndertake environmental field-based monitoring*. Resources may include:

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EVIDENCE GUIDE	
	• equipment and resources for investigating the physiology of plants and animals in the laboratory • enterprise procedures, sampling plans, test methods and equipment manuals • computers and programs for simulated experiments or data analysis.

Method of assessment	The following assessment methods are suggested:
	• review of data/results obtained by the candidate over time to ensure accuracy, consistency and timeliness of results
	• inspection of records and workplace documentation completed by the candidate
	• observation of the candidate processing specimens and/or conducting analyses
	• review of computer and literature research of data to support an experiment
	• questioning about procedures that form part of experiments in progress
	• review of case studies prepared by the candidate, such as:
	  • relating field and laboratory data in an environmental impact statement
	  • preservation of plant species and placement in a herbarium
	  • plant propagation in a variety of controlled environments
	  • maintenance of cultures of protozoans or invertebrates.
	In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly.
	Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
	Access must be provided to appropriate learning and/or assessment support when required.
	The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like

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	environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Environmental (1)** A technical officer has been asked to preserve plant specimens and compile a report of classified species using material and data collected during a recent visit to a decommissioned open cut mine site and its adjacent areas. The supervising ecologist has been asked to advise the mine owner about replacement planting to restore the mine site in sympathy with its locality. The technical officer records descriptions of features of each specimen. They use this data to classify the species by referring to the field report, atlases and specimens in the reference herbarium. They then prepare each specimen for drying and preservation in readiness for labelling and cataloguing. To compile the report, the technical officer prepares a map of the area to be regenerated. The map details the topographic features and illustrates possible species which could be planted. To assist the landscape contractors, the technical officer advises where the required species can be purchased and the type of soils required for growth. **Environmental (2)** A technical officer, who worked for a large aluminium smelter, was asked to examine some grapevine leaves that a local farmer argued were affected by fluoride emissions from the plant. Initially, the leaves were subjected to a detailed microscopic examination using standard procedures developed by the company covering the effect of gaseous pollutants (such as ozone and fluoride) on major natural and/or agricultural plants. The preliminary findings suggested that the leaves were affected by a fungi rather than fluoride. However, given the sensitive nature of the issue, they checked with the supervisor and arranged to send the affected leaves to a nearby university for a second opinion. This additional study also concluded that the impact on the leaves was not due to fluoride.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	• AS/NZS ISO 9000 Set:2008 Quality management systems set
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• animal welfare legislation and codes of practice
	• OHS national standards and codes of practice
	• national environment protection measures
	• Guide to physical containment levels and facility types
	• Australian Quarantine and Inspection Service (AQIS) Export Control (Orders) Regulations 1982
	• instructions to comply with new legislation, standards, guidelines and codes
	• enterprise procedures, standard operating procedures (SOPs) and operating manuals
	• validated and authorised test procedures
	• laboratory sampling procedures for labelling, preparation, storage, transport and disposal
	• safety procedures to minimise contraction of zoonoses
	• safety requirements for equipment, materials or products

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RANGE STATEMENT	
	• quality system and continued improvement processes • incident and accident/injury reports • schematics, work flows and laboratory layouts • stock records and inventory • waste minimisation, disposal protocols and environment protection procedures
Items of equipment, **reagents**, **specimens and systems for botanical and zoological techniques**	Items of equipment, reagents, specimens and systems for botanical and zoological techniques may include: • dissecting, stereo and other microscopes • hand lenses • dissecting equipment • balances and scales • calipers, rules and measuring tapes • pH meters, dissolved oxygen probes and other potentiometric equipment • spectrometers • physiological monitors for temperature and respiration • monitors for experimental variables, such as temperature and humidity • hand-held microtomes and microtome knives (non-disposable or disposable) • tissue processors • incubators, water baths and controlled environment chambers • greenhouse • volumetric glassware and measuring devices • general laboratory glassware and equipment identified with an anatomical pathology laboratory • chemicals for preparation of nutrient and culture requirements • chemicals for tests of plant and animal physiology and pathology • reference material for quality control and quality assurance systems • computer or other classification keys • laboratory information management systems (LIMS), databases, record and filing systems, including specimen accessioning

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RANGE STATEMENT	
Communication	Communication may include: • scientists • field workers • local government professionals or representatives of state/territory authorities, such as environmental protection agencies • supervisors and managers (laboratory, quality and customer service) • clients
Hazards	Hazards may include: • microbiological organisms and agents, associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as acids, solvents and stains • sharps and broken glassware • flammable liquids and gases • fluids under pressure, such as steam and industrial gases • disturbance or interruption of services
Safe work practices	Safe work practices may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, material safety data sheets (MSDS) and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning and decontaminating equipment and work areas regularly using enterprise procedures • using personal protective equipment, such as gloves, safety glasses, coveralls, gowns, hearing protection and safety boots • using containment facilities (PCII, PCIII and PCIV physical containment laboratories),

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RANGE STATEMENT	
	containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets) and containment procedures • following established manual handling procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Disposal of biohazardous wastes	Disposal of biohazardous wastes may include: • collection for sterilisation by autoclaving (e.g. autoclaving of microbiological plates) • appropriate storage (e.g. of waste containing radioactive isotopes) • use of biohazard waste containers
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL975011A Design and supervise complex environmental field surveys

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to design and supervise complex field surveys for a wide range of environmental systems. This unit covers confirming survey requirements, designing and organising field surveys to achieve their purpose and supervising the field survey according to a defined plan.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical officers working in the environmental industry sector. All operations must comply with relevant standards, appropriate procedures and/or enterprise requirements. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		
	MSL974007A	*Undertake environmental filed-based monitoring*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Confirm survey requirements with senior staff	1.1. Confirm the purpose and objectives of the field survey activities with senior management and the level/detail of information required 1.2. Clarify with all stakeholders the purpose and objectives of the field survey activities within the context of the enterprise's overall environmental program 1.3. Identify and accurately interpret all external statutory requirements and enterprise protocols that relate to the defined field survey activities 1.4. Analyse drivers and constraints that may influence field survey activities 1.5. Document the type, quantity and quality of data needed to meet the defined objectives 1.6. Refine and document the detailed objectives of the

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ELEMENT	PERFORMANCE CRITERIA
	field activities with senior management and key stakeholders
2. Design field survey activities	2.1. Develop and document details of the field survey methodology and, if appropriate, trial and refine them under field conditions 2.2. Discuss and confirm survey methodology with senior staff and external experts or stakeholders, as appropriate 2.3. Develop work program, including timetable and staff roles and responsibilities for the total field survey and all related activities 2.4. Ensure that work program conforms to enterprise requirements covering risk management, data quality procedures, safety, environmental and emergency requirements 2.5. Document work program, address all administration requirements and obtain appropriate approvals
3. Identify resources and supervise pre-survey checks	3.1. Identify and list all resources required to implement the agreed work program 3.2. Arrange collection and checking of all equipment, field instruments, and supplies required for implementation of the work program 3.3. Supervise calibration of all appropriate field instruments 3.4. Arrange correct packaging and transportation of equipment and instruments 3.5. Ensure that all access, transport, communication and emergency systems have been arranged and are suitable for all field locations and activities
4. Supervise field survey activities	4.1. Supervise all field survey and associated activities 4.2. Monitor equitable duty rosters covering field surveys activities in consultation with all staff 4.3. Ensure that all data quality procedures are followed 4.4. Ensure that all survey work is performed safely and with minimal impact on the environment
5. Supervise close down of field activities	5.1. Arrange for the checking, packaging and transportation of all samples, equipment, and instruments back to base 5.2. Ensure that site is left in accordance with enterprise and environmental requirements 5.3. Monitor dispatch of collected samples for

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ELEMENT	PERFORMANCE CRITERIA
	subsequent laboratory analyses 5.4. Ensure before final storage that all equipment and instruments are tested and decontaminated, as necessary 5.5. Ensure all field data is stored appropriately for subsequent analysis 5.6. Report results, any anomalies and recommendations to data analysers, users and/or supervisor

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- selecting and applying appropriate field survey practices
- identifying and using equipment and instruments
- sample collection, preservation, labelling, packaging, storage and transportation
- project management
- communicating effectively with senior staff and stakeholders
- modifying existing field survey protocols
- supervising junior staff
- developing, documenting and supervising field survey work programs
- managing day-to-day field surveys and associated activities
- adapting field activities to suit changing circumstances
- completing field survey planning and documentation
- communicating specific activities to all relevant staff as part of the total field survey work program
- negotiating effectively with staff and stakeholders and resolving conflict

Required knowledge

Required knowledge includes:

- understanding of the purpose and objectives of the activity including:
  - information and analysis required
  - end users of information
  - significance of outcomes for broader programs

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REQUIRED SKILLS AND KNOWLEDGE
• rights and responsibilities of employers and employees • enterprise legal requirements regarding field survey activities • enterprise risk-management requirements • field survey protocols • specific field survey practices and techniques • correct terminology relevant to the defined field survey activity • data quality procedures • survey principles and practices • field safety, environmental and emergency requirements • data recording and storage methods • environmental planning and assessment procedures • current developments in field instrumentation, survey equipment and communication systems • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can:
	• demonstrate understanding of the purpose and objectives of the activity including:
	  • information and analysis required
	  • end users of information
	  • significance of outcomes for broader programs
	• demonstrate understanding of the rights and responsibilities of employers and employees in terms of the following:
	  • enterprise legal requirements regarding field survey activities
	  • enterprise data quality procedures
	  • enterprise field safety procedures
	  • riskmanagement requirements
	  • enterprise field emergency plans

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EVIDENCE GUIDE	
	• enterprise environmental requirements • field survey protocols • communicate effectively with senior staff and stakeholders • modify existing field survey protocols • supervise junior staff, where appropriate • develop, document and supervise field survey work program • manage day-to-day field surveys and associated activities • adapt field activities to suit changing circumstances • complete field survey planning and documentation clearly and accurately within specified time frame • accurately communicate to all relevant staff their specific activities as part of the total field survey work program • negotiate effectively with staff and stakeholders and resolve conflicts, where possible.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL935004A Maintain instruments and equipment*. Resources may include: • legislation, regulations, codes of practice, enterprise procedures and field protocols • vehicles, survey equipment, sampling/monitoring equipment, consumables and manuals.
Method of assessment	The following assessment methods are suggested: • review of environmental field survey plan designed by the candidate • observation of fieldwork performed by the candidate with a focus on: • field survey practices and procedures • accurate data recording and reporting • safety, emergency and environmental impact assessment associated with survey activities • communication techniques • general pre-survey site reconnaissance • feedback from peers and supervisors that relevant

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EVIDENCE GUIDE	
	enterprise procedures were clearly and accurately followed • feedback from stakeholders that consultation and outcomes met their needs, where appropriate • oral and written questions to assess underpinning knowledge • simulation exercises to observe general field survey preparation, accident situations and emergency responses. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Environmental (1)** An environmental officer is asked to design and supervise a series of field surveys covering soils, flora, fauna and water quality. Part of the study area is potentially high in nature conservation value with the rest of the area being considered for low density residential development. The aim of the study is to determine which parts of the study area should be set aside for protected open space and, if so, to develop an environmental management plan based on the results of the field surveys. **Environmental (2)** A technical officer is part of a team preparing an environmental impact statement (EIS) for a large

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EVIDENCE GUIDE	
	industrial site. The technical officer is responsible for supervising all associated field surveys. They need to understand the requirements of the relevant environment protection legislation and local environment department, full details of all field surveys and associated enterprise procedures and how to present data so that it can be efficiently incorporated into the draft EIS. Based on this information the technical officer prepares a detailed work plan, and associated timeline, which identifies all field survey activities and associated resources. They are also careful to identify all quality assurance requirements. The draft EIS report is reviewed closely by management before its release given the level of public interest and the possibility of court action sometime in the future.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • animal welfare codes and ethics committee approval • codes of practice and field protocols • consultation (e.g. with traditional owners) • data quality assurance procedures • emergency plans • environmental audits • environmental impact assessment procedures • environmental protection and conservation legislation

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RANGE STATEMENT	
	• environmental standards (e.g. air, water and noise) • existing plans covering environmental field activities • field survey plans • fieldwork procedures and standard operating procedures (SOPs) • industry based protocols • national environment protection measures • occupational health and safety (OHS) national standards and codes of practice • permits for access to land (e.g. Aboriginal reserves) • permits for wildlife capture and handling • policies and statutory requirements • risk management plans • safety and accident/injury plans
Field survey activities	Field survey activities may include: • meteorology • geology • soils • hydrology • geomorphology • water quality • noise • vegetation • wildlife • climate • land uses • land resources • agriculture • forestry • mining • conservation • recreation
Clients and stakeholders	Clients and stakeholders may include: • Commonwealth, state/territory and local government agencies • organisation with monitoring and/or survey responsibilities

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RANGE STATEMENT	
	• regulatory authorities • private companies • developers
The purpose or objective of the field survey	The purpose or objective of the field survey may include: • part of enterprise environmental management plan • statutory requirements • environmental impact assessment for major development • environment audit • pollution control activity • general environmental and ecological surveys • research studies
Drivers and constraints	Drivers and constraints may include: • political agendas, social and economic issues • new field survey protocols or codes of practice • recent judicial decisions • recent environmental impact assessments or audits • media or public concerns • field safety or accident/incident issues • competencies and availability of staff • time available to design and implement field activities
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects • power tools, generators and moving machinery • vehicle and boat handling in rough/remote conditions
Safety procedures and control measures	Safety procedures and control measures may include: • use of personal protective equipment, such as sunscreen, hats, safety glasses, gloves,

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RANGE STATEMENT	
	coveralls and safety boots • 'stay with vehicle' and other survival techniques • regular communication schedule • global positioning system (GPS), maps and aerial photos • handling, storage and disposal of all hazardous materials/waste in accordance with material safety data sheets (MSDS), labels, enterprise procedures, codes and regulations
Administrative requirements and approvals	Administrative requirements and approvals may include: • travel requisitions • authority for use of vehicles and equipment • insurance • permits
Field survey resources	Field survey resources may include: • staff with appropriate competencies • transport systems (e.g. vehicles, boats and aircraft) • navigation and communication equipment • sampling and monitoring equipment • standard and specialised monitoring equipment • survey equipment • general field monitoring and/or field testing equipment • first aid and/or survival kits and equipment • consumables
Field instruments and equipment	Field instruments and equipment may include: • samplers (e.g. air, surface and groundwater, bottom sediments, soils and animals) • meters (e.g. dissolved oxygen, conductivity, pH, turbidity, liquid flow, light, rainfall, humidity, temperature, oxides of carbon, oxides of sulphur, oxides of nitrogen, particulates, ozone and hydrocarbons) • associated information, such as equipment operating manuals, field instrument operating instructions, calibration procedures, instrument fault finding procedures, general maintenance

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RANGE STATEMENT	
	and repair procedures, first aid and survival manuals
Field procedures	Field procedures may include: • sampling • field testing (validated and authorised) • animal trapping (and release), tagging and keeping • emergency response, safety and survival aspects • data collection, analysis and reporting • protection of the environment
Typical problems	Typical problems may include: • unexpected restriction on access to sites • seasonal conditions • equipment failure or loss • communication failure/difficulties • unforseen environment impacts • contact with hazardous wastes
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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PSPRAD703A Perform basic radiation measurements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the ability to directly measure radiation by following the organisation's procedures and using instruments calibrated by others. Basic radiation measurements will be straightforward involving one or two steps, take a short time and produce results that can be easily compared with specified limits. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit of competency applies to personnel undertaking radiation-related work activities, including: • extracting, milling, processing and packing radioactive ores • operating, installing, servicing and calibrating fixed radiation gauges, bore hole logging or industrial radiography equipment, and moisture/density gauges • decontaminating and servicing equipment that has been in contact with radioactive material • XRF and XRD analysis • collecting, preparing and testing samples containing radioactive materials • using radionuclides in a laboratory. Measurements that are part of this unit would be performed under the authorisation and supervision, or delegated supervision, of a responsible person and in accordance with radiation protection safety standards, codes and guidelines. The activities may take place:

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	• at a mine or plant that processes radioactive ore and minerals • with instruments that emit ionising radiation at geotechnical, construction, mining and manufacturing sites, or analytical and research facilities • in a laboratory or licensed facility that handles radioactive materials or has radiation-emitting apparatus • in a nuclear facility.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. **Prepare for**	1.1. Confirm purpose, priority and nature of required

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ELEMENT	PERFORMANCE CRITERIA
radiation measurements.	***ionising radiation measurements*** and any site access arrangements with supervisor. 1.2. Use organisation's ***radiation management plan*** to obtain information about the ***hazards*** associated with performing the measurements, ***measuring instruments*** and ***safe working rules*** to be used and refer to ***radiation protection safety standards***, ***codes and guidelines*** as necessary. 1.3. Perform and record pre-use checks of measuring instruments and tag or replace faulty items as necessary. 1.4. Check that ***personal protective equipment*** (PPE) and other task-related equipment is fit for purpose. 1.5. Stow measuring instruments and task-related equipment to ensure safe transport to the site and within the boundaries of the site if required.
2. **Obtain reliable radiation data**.	2.1. Operate measuring instruments in accordance with radiation management plan and manufacturer specifications and applying safe working rules to minimise personal radiation exposure. 2.2. Perform measurements at specified locations and times and in accordance with organisational procedures. 2.3. Seek advice if required measurements cannot be made or if specified procedures require modification. 2.4. Conduct regular instrument checks and minor maintenance (e.g. battery changes) if required. 2.5. Take sufficient measurements to ensure reliable data. 2.6. Recognise obvious errors and atypical data, and take ***appropriate corrective actions***. 2.7. Record data with the required precision, accuracy and units. 2.8. Record environmental/site conditions or observations that may impact on data quality.
3. **Finalise radiation measurements**.	3.1. Check for contamination and, if necessary, perform personal decontamination in accordance with radiation management plan. 3.2. Re-stow measuring instruments and task-related equipment to ensure safe transport from the site and within the boundaries of the site if required.

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Record use of PPE and measuring instruments according to radiation management plan. 3.4. Check condition of measuring instruments, PPE and task-related equipment before storing them in accordance with manufacturer's recommendations and radiation management plan.
4. **Report results**.	4.1. Record results according to organisational procedures. 4.2. Compare results with relevant radiation limits and identify/record significant differences or atypical results. 4.3. Maintain ***required records*** that are complete, accurate, legible and secure.
5. **Respond to potential or actual radiation incidents**.	5.1. Recognise unusual situations, unexpected hazards, and potential or actual emergency ***radiation incidents***. 5.2. Inform relevant personnel about the situation, hazard or incident and seek their advice. 5.3. Initiate appropriate workplace emergency first response in accordance with instructions, radiation management plans and organisation's ***response procedures***.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• applying manufacturer's recommended procedures for using and caring for radiation measuring instruments • applying safe working rules and those parts of the organisation's radiation management plan relevant to job role • conducting pre-use checks and simple maintenance for radiation measuring instruments and task-related equipment used in job role • reading scales and displays accurately for a wide range of values • recording radiation results legibly and with the specified accuracy, precision and units • regularly assessing and reassessing hazards and taking appropriate protective

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REQUIRED SKILLS AND KNOWLEDGE
measures • seeking advice and further directions when faced with unforeseen circumstances or situations that may require decisions or response actions beyond technical competence • using and caring for PPE used in job role
Required knowledge

• terms and concepts, such as ionising radiation, radioactivity, radioactive material, activity, dose, contamination, contamination controls, shielding, half-life, radionuclide, and safe distance
• types and properties of ionising radiation (e.g. alpha, beta, gamma, neutron, x-ray, electron), sources and shielding methods
• types of radiation measuring instruments used in job role, such as air proportional, gas proportional, gas ionisation, Geiger-Muller (GM), compensated GM, scintillation, neutron monitors, solid state, and personal dosimeters (badge and electronic)
• definitions of radiation quantities, such as exposure, dose, and relevant dose limits
• international system (SI) of units for radiation quantities, multiples and sub-multiples, and significant figures
• function of key components and operating principles of radiation measuring instruments used in job role
• effects on results of modifying instrument settings and variables
• basic instrument troubleshooting and maintenance procedures
• guidelines and safety procedures for working with radiation sources, based on principles:
  • reducing exposure time
  • maintaining greatest distance
  • using as much shielding as possible
• techniques for assessing radiation hazards likely to be encountered in job role
• health, safety and workplace emergency response procedures relevant to job role

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

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EVIDENCE GUIDE	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessment must confirm the ability to: • work safely in a radiation environment • use measuring instruments to obtain reliable radiation data • care for radiation measuring instruments and PPE • record radiation data accurately and report results • keep accurate and complete records relevant to job role or assigned tasks. **Consistency in performance** Competency should be demonstrated by safely undertaking a variety of radiation measurement tasks using appropriate instruments.
Context of and specific resources for assessment	Competency should be assessed in the workplace or a simulated workplace environment. Assessment must comply with: • local regulations regarding the registration of operators, premises and sources at workplaces where radioactive materials and/or ionising radiation equipment are present • organisation's radiation management plan • manufacturer's instructions for operating radiation measuring instruments. Access may be required to: • registered premises and sources • supervision by a radiation safety professional • radiation measuring instruments • appropriate PPE • organisation's radiation management plan and operating procedures.

Method of assessment	The following assessment methods are suggested:
	• oral or written tests and calculations involving:
	  • radiation terms, principles and quantities
	  • pre-use checks, operation and basic maintenance of radiation measuring instruments
	  • care and use of specified PPE
	• review of radiation data, results and records generated by the candidate
	• feedback from peers and supervisor that the candidate consistently applies relevant radiation protection and safety requirements
	• observation of the candidate using and caring for radiation

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EVIDENCE GUIDE	
	measuring instruments and PPE in a simulated radiation environment. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency that are difficult to assess directly.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Ionising radiation may include:	• x-rays, electrons, neutrons, gamma rays, beta particles and alpha particles emitted from radioactive materials, including sealed and unsealed sources • neutrons emitted from generator tubes • x-rays generated by industrial radiography equipment, XRF and XRD instruments.
Radiation measurements may include:	• recording background levels • recording radiation levels during the operation of sealed source equipment • confirming that a sealed source has been returned to the fully shielded position in its container • assessing integrity of packaging or shielding • locating contamination on personnel and equipment • determining the effectiveness of decontamination.
Radiation management plan should include details of:	• safe working rules and workplace emergency response procedures • roles and responsibilities of personnel • radiation monitoring requirements • control of an incident involving a source • storage of a source • accountability and records

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RANGE STATEMENT	
	• other requirements that may have a bearing on safety.
Hazards may include:	• inhalation of radioactive dust or gas • ingestion of radioactive dust or contaminated food or water • unexpected exposure to sealed or unsealed radiation sources or partially enclosed equipment that emits ionising radiation.
Measuring instruments may include:	• air proportional (alpha) • gas proportional (alpha, beta) • gas ionisation (gamma) • Geiger-Muller (beta, gamma) • ionisation (beta) • scintillation (alpha, beta, gamma) • solid state (alpha, gamma).
Safe working rules relevant to performing basic radiation measurements may include:	• safe methods for conducting specific radiation measurements and wipe tests • procedures for recording and reporting results • types and occasions for use of personal monitoring devices • personal decontamination procedures.

Radiation protection safety standards, ***codes and guidelines*** may include:	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) radiation protection series publications, such as:
	  • RPS No.1 Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (republished 2002)
	  • RPS No.7 Recommendations for Intervention in Emergency Situations Involving Radiation Exposure (2004)
	• requirements of commonwealth, state and territory radiation protection and safety legislation
	• definition of a responsible person.

Personal protective equipment may include:	• gloves, over-boots, safety hats, goggles, face masks, overalls and gowns • respirators or HEPA filter masks.
Appropriate corrective actions may include:	• accuracy check of data entry and transcription • logical check of instrument set-up • check of calibration, zero error and drift for measuring instrument • check of source-detector geometry/distance • careful re-reading of procedures and checklists

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RANGE STATEMENT	
	• repeat radiation measurements • seeking advice.
Required records may include details of:	• calibration, inspection, and use and maintenance of radiation instruments and equipment • incidents and accidents involving exposure to radiation.

Radiation incidents may include:	• exposure of unauthorised personnel entering a controlled area
	• personal exposure above statutory exposure limits and a monitoring result in excess of statutory derived levels of exposure
	• exposure from an uncontrolled, high hazard radioactive sealed source that:
	  • has loss or destruction of shielding
	  • is involved in a transport accident
	  • is lost, missing or stolen
	  • has malfunction of its shutter or interlocks
	  • has been dropped during removal from its container
	  • has jammed in an unsafe position
	• exposure from equipment that emits ionising radiation and has:
	  • loss or destruction of shielding
	  • malfunction of its shutter or interlocks
	• exposure from dispersed radioactive material caused by:
	  • leakage or radioactive contamination
	  • industrial or laboratory accident
	  • uncontrolled releases of radioactive materials from a mine site, such as dust or contaminated water
	  • dispersion of contaminants following destruction of a high activity sealed source.

Response procedures will include:	• instructions for keeping exposures to a minimum, consistent with essential operations through evacuation or otherwise • instructions for notifying relevant competent authority if required.

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Unit Sector(s)

Unit sector	

Competency field

Competency field	Radiation Safety

Co-requisite units

Co-requisite units	

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MSL974006A Perform biological procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to interpret work requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine biological procedures, including sample preparation. These procedures may involve several steps and are used to classify cell types, species and biologically active compounds by analysing their biological and chemical characteristics. This unit includes data processing, interpretation of results and troubleshooting obvious departures from standard procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical assistants working in the biomedical, environmental, biotechnology and education industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		
	MSL973004A	*Perform aseptic techniques*
	MSL973007A	*Perform microscopic examination*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret and schedule work requirements	1.1. Review work request to identify samples, required procedures and materials/equipment/instruments involved 1.2. Identify hazards and enterprise control measures associated with the sample, preparation methods, reagents and/or equipment 1.3. Plan parallel work sequences to optimise throughput of multiple sets of samples, if appropriate
2. Receive and prepare biological samples	2.1. Log samples using standard operating procedures (SOPs) 2.2. Record sample description, compare with specification and note and report discrepancies 2.3. Prepare samples in accordance with testing

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ELEMENT	PERFORMANCE CRITERIA
	requirements 2.4. Ensure traceability of sample from receipt to reporting of results
3. Perform techniques that assist in the classification of a cell or species	3.1. Select suitable techniques in accordance with enterprise requirements and methods 3.2. Set up and use equipment and reagents in accordance with the method 3.3. Perform techniques in accordance with the method
4. Perform techniques that analyse biological activity	4.1. Select suitable techniques in accordance with enterprise requirements and methods 4.2. Set up and use equipment and reagents in accordance with the method 4.3. Perform techniques in accordance with the method
5. Process and interpret data	5.1. Record test data noting atypical observations 5.2. Construct calibration graphs, if appropriate, and compute results for all samples from these graphs 5.3. Ensure calculated values are consistent with expectations 5.4. Record and report results in accordance with enterprise procedures 5.5. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.6. Interpret trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.7. Determine if obvious procedure or equipment problems have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes 6.3. Ensure the safe disposal of biohazardous wastes 6.4. Clean, care for and store equipment and reagents as required
7. Maintain laboratory records	7.1. Record approved data into enterprise system 7.2. Maintain confidentiality and security of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- using instruments for qualitative and/or quantitative analysis
- sample preparation and separation techniques
- performing calibration checks
- metrology techniques underpinning test/procedure including estimating uncertainty
- maintaining and evaluating reagents
- troubleshooting basic equipment/method
- preparingand using calibration graphs and calculating results using appropriate units and precision
- applying theoretical knowledge to interpret gross features of data and make relevant conclusions such as identifying atypical results as out of normal range or an artefact
- tracing and sourcing obvious causes of an artefact
- recording and communicating results in accordance with enterprise procedures
- maintaining security, integrity, traceability of samples, sub-samples, test data, results and documentation

Required knowledge

Required knowledge includes:

- hazards and risks in biological laboratories
- principles and concepts related to equipment/instrument operation and testing
- function of key components of the equipment/instrument and/or reagents
- effects of modifying equipment/instrument variables
- basic equipment/method troubleshooting procedures
- calculation steps to give results in appropriate units and precision
- sources of uncertainty in measurement and methods for control
- importance and appropriate use of controls and certified reference materials
- enterprise and/or legal requirements for traceability
- relevant health, safety and environmental requirements

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • interpret test procedures accurately • prepare and test samples using procedures appropriate to the nature of sample • perform calibration checks (if required) • safely operate test equipment to enterprise standards and/or manufacturer's specification • prepare calibration graphs and calculate results in appropriate units and precision • apply basic theoretical knowledge to interpret gross features of data and make relevant conclusions • identify atypical results as out of normal range or an artefact using reference material or quality control sera • trace and source obvious causes of an artefact • communicate problems to a supervisor or outside service technician • record and communicate results according to enterprise procedures • maintain security, integrity, traceability and identity of samples, sub-samples and documentation • follow OHS procedures and principles of GLP.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL974003A Perform chemical tests and procedures*. Resources may include: • standard laboratory equipped with appropriate test equipment and instruments, reagents and materials • SOPs and testing methods.
Method of assessment	The following assessment methods are suggested:

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EVIDENCE GUIDE	
	• review of results obtained by the candidate over a period of time to ensure accuracy, consistency and timeliness • review of testing records and workplace documentation completed by the candidate • observation of candidate conducting a range of biological procedures • feedback from peers and supervisors • oral or written questioning of biological concepts, principles and enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Biomedical** (**1**) A laboratory technician conducts a screening test for parasites in stool samples. She/he checks the sample identification details, cross-checks the sample barcode with the request slip and the data entry in the laboratory information management system (LIMS). The technician locates the test method and then examines the sample container to ensure that it has not leaked and that there is sufficient volume for the test. She/he prepares the sample by adding solvent to a portion and shaking it before placing it in a centrifuge. After satisfactory separation, she/he pipettes a small quantity of the top layer of solvent onto a glass slide and adds iodine as a stain. The technician carefully views the slide using x40

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EVIDENCE GUIDE	
	magnification and searches for eggs. She/he enters a nil result in the LIMS and disposes of the sample in accordance with enterprise procedures. **Biomedical** (**2**) A technical officer is requested to determine the total protein concentration of a blood sample using colorimetry. After checking the condition of the sample, she/he collects the Biuret reagent from the refrigerator, the required number of tubes and protein control samples and standards specified in the method. The officer labels the tubes and then accurately dispenses the correct volumes of reagent, standards, controls and samples into them. The solutions are thoroughly mixed using a vortex mixer and allowed to stand for five minutes for the reaction to occur. She/he records absorbance readings for each tube and prepares a calibration curve. The officer reads the concentration values from the graph for the control and test samples and checks the control data against the expected values. As these fall within the accepted range, she/he enters the test results into the LIMS.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australian and international standards, such as: • AS 2134.1-1999 Recommended practice for chemical analysis by atomic absorption

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RANGE STATEMENT	
	spectrometry - Flame atomic absorption spectrometry • AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware • AS 3753-2001 Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry • AS ISO 1000-1998 The international system of units (SI) and its application • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • AS/NZS ISO 9000 Set:2008 Quality management systems set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • industry methods, such as Royal Australian Chemical Institute (RACI) and/or American Association of Cereal Chemists (AACC) methods for inorganic constituents • material safety data sheets (MSDS) and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals and equipment and procedure manuals • SOPs • waste minimisation and safe disposal procedures
Biological principles and concepts underpinning tests and	Biological principles and concepts underpinning tests and procedures may include:

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RANGE STATEMENT	
procedures	• molecular interactions within the compounds of nucleic acids and nucleotides, proteins and amino acids, carbohydrates, lipids and vitamins, influencing structure, activity, chemical reactivity and physical properties, including solubility, energy levels and emission/absorption spectra • chemical and biochemical characteristics of lipids, carbohydrates, nucleic acids and proteins influencing structure, function and reactivity both in vitro and in vivo • chemical significance of biologically significant ions, such as calcium, zinc, iron, magnesium, sodium, potassium, chloride and phosphate • key metabolic pathways and the significance of initial nutrients, products and wastes on those pathways • structure and function of organelles, cells, plant and animal tissue and organs • interrelationships of biological systems (carbon cycle, energy cycle and the web of life) • classifications, such as bacteria, viruses, yeasts, single cell, multi-cellular, plants, animals, prions, helminths, prokaryotes and eukaryotes • phases of the cell cycle • Mendelian genetics, such as inheritance, meiosis, karyotypes, dominant and recessive traits, genotypes and phenotypes, and pedigrees • significance of the genetic code and transcription and translation • cell membrane activity, including diffusion (passive, facilitated and active), osmosis, tonicity and plasmolysis • staining reactions involving acid/base, redox, complex ion formation, solubility and equilibrium
Techniques for preparation of samples	Techniques for preparation of samples may include: • dissection, such as preparation of thymus extracts from mice • extraction (e.g. solvent extraction) • filtration (e.g. filter water samples and plate the

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RANGE STATEMENT	

	sediment onto agar plates for incubation and growth of E. coli)
	• separation (e.g. dialysis)
	• precipitation and flocculation
	• centrifugation (excluding ultra centrifugation)
	• chromatography:
	  • gel filtration chromatography (e.g. crude purification of proteins)
	  • affinity chromatography (e.g. purification of immunoglobulins)
	• electrophoresis:
	  • polyacrylamide gel electrophoresis for separation of DNA segments
	  • agarose gel electrophoresis
	  • capillary electrophoresis
	  • gradient gel electrophoresis

Techniques to classify cells or species	Techniques to classify cells or species may include:
	• classification of species according to taxa
	• classification of cells according to microscopic or staining characteristics
	• characteristics of bacterial colonies:
	  • growth on differential media
	  • colony morphology (size and shape)
	  • biochemical reactions, such as miniaturised test strips, redox reactions and sugar tests

Techniques to analyse chemical and biological characteristics	Techniques to analyse chemical and biological characteristics may include:
	• staining:
	  • Gram stain for gram negative and positive bacteria
	  • Romanowsky stain for blood films
	  • Haematoxylin and Eosin for tissue sections
	  • Oil red O for fatty cellular inclusions
	  • spore staining
	  • flagella staining
	• microscopic examination:
	  • light
	  • phase contrast

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RANGE STATEMENT	
	• bright field • dark ground • enumeration • colorimetry and spectrophotometry: • ultraviolet/visible • fluorimetric • infrared • flame emission • atomic absorption spectrometry • electrochemistry: • pH • ion selective electrodes and polarography (e.g. concentration of chloride ions) • chromatography: • column and thin layer analytical and preparative chromatography • gas and liquid chromatography for purity, raw material and formulation checks
Hazards	Hazards may include: • microbiological organisms and agents, associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • chemicals, such as acids, solvents and stains • aerosols from broken centrifuge tubes and pipetting • sharps and broken glassware • flammable liquids and gases • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam, hydrogen in gas liquid chromatography and acetylene in atomic absorption spectrometry • sources of ignition • disturbance or interruption of services
Hazard control measures	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, reagents, aliquoted

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RANGE STATEMENT	
	samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning and decontaminating equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as gloves, safety glasses, coveralls and gowns • using containment facilities (PCII, PCIII and PCIV physical containment laboratories), containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets) and containment procedures • following established manual handling procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Disposal of biohazardous wastes	Disposal of biohazardous wastes may include: • collection for sterilisation by autoclaving (e.g. autoclaving of microbiological plates) • appropriate storage (e.g. of waste containing radioactive isotopes) • use of biohazard waste containers
Records	Records may include: • test calibration results • equipment use, maintenance and servicing history • faulty or unsafe equipment • batch number, catalogue number and use by date for analytical kits
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise

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RANGE STATEMENT	
	OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974003A Perform chemical tests and procedures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to interpret chemical test requirements, prepare samples, conduct pre-use and calibration checks on equipment and perform routine chemical tests/procedures. These tests will involve several measurement steps. The unit includes data processing and interpretation of results and tracking of obvious test malfunctions where the procedure is standardised. However, personnel are not required to analyse data, optimise tests/procedures for specific samples or troubleshoot equipment problems where the solution is not apparent.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory or technical assistants and instrument operators in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Interpret and schedule test requirements	1.1. Review test request to identify samples to be tested, test method and equipment/instruments involved 1.2. Identify hazards and enterprise control measures associated with the sample, preparation/test methods, reagents and/or equipment 1.3. Plan work sequences to optimise throughput of multiple samples, if appropriate
2. Receive and prepare samples	2.1. Log samples using standard operating procedures (SOPs) 2.2. Record sample description, compare with specification and note and report discrepancies 2.3. Prepare samples and standards in accordance with chemical testing requirements 2.4. Ensure traceability of samples from receipt to

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ELEMENT	PERFORMANCE CRITERIA
	reporting of results
3. Check equipment before use	3.1. Set up equipment/instruments in accordance with test method requirements 3.2. Perform pre-use and safety checks in accordance with relevant enterprise and operating procedures 3.3. Identify faulty or unsafe components and equipment and report to appropriate personnel 3.4. Check equipment calibration using specified standards and procedures, if applicable 3.5. Quarantine out of calibration equipment/instruments 3.6. Ensure reagents required for the test are available and meet quality requirements
4. Test samples to determine chemical species or properties	4.1. Operate equipment/instruments in accordance with test method requirements 4.2. Perform tests/procedures on all samples and standards, if appropriate, in accordance with specified methods 4.3. Shut down equipment/instruments in accordance with operating procedures
5. Process and interpret data	5.1. Record test data noting atypical observations 5.2. Construct calibration graphs, if appropriate, and compute results for all samples from these graphs 5.3. Ensure calculated values are consistent with expectations 5.4. Record and report results in accordance with enterprise procedures 5.5. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 5.6. Interpret trends in data and/or results and report out of specification or atypical results promptly to appropriate personnel 5.7. Determine if obvious procedure or equipment problems have led to atypical data or results
6. Maintain a safe work environment	6.1. Use established safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel 6.2. Minimise the generation of wastes and environmental impacts 6.3. Ensure the safe collection of laboratory and hazardous waste for subsequent disposal 6.4. Care for and store equipment and reagents as

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ELEMENT	PERFORMANCE CRITERIA
	required
7. Maintain laboratory records	7.1. Enter approved data into laboratory information management system 7.2. Maintain confidentiality and security of enterprise information and laboratory data 7.3. Maintain equipment and calibration logs in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting test methods and procedures
- sample preparation procedures
- performing calibration checks
- using instruments for qualitative and/or quantitative analysis
- maintaining and evaluating reagents
- troubleshooting basic equipment/method
- using calculation methods, including appropriate units, uncertainties, balancing equations, and the concentration of the solution given the chemical reaction for the titration
- preparing calibration graphs and calculating results using appropriate units and precision
- applying theoretical knowledge to interpret gross features of data and make relevant conclusions such as identifying atypical results as out of normal range or an artefact
- tracing and sourcing obvious causes of an artefact
- recording and communicating results in accordance with enterprise procedures
- maintaining security, integrity, traceability of samples, sub-samples, test data, results and documentation

Required knowledge

Required knowledge includes:

- chemical principles and concepts underpinning test/procedure
- purpose of the tests

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REQUIRED SKILLS AND KNOWLEDGE
• concepts of metrology • principles and concepts related to equipment/instrument operation and testing • function of key components of the equipment/instrument and/or reagents • effects of modifying equipment/instrument variables • use of calibration procedures • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • interpret test methods/procedures accurately • prepare and test samples using procedures appropriate to the nature of sample • perform calibration checks (if required) • safely operate test equipment/instruments to enterprise standards and/or manufacturer's specification • prepare calibration graphs and calculate results using appropriate units and precision • apply basic theoretical knowledge to interpret gross features of data and make relevant conclusions • identify atypical results as out of normal range or an artefact • traces and source obvious causes of an artefact • communicate problems to a supervisor or outside service technician • record and communicate results in accordance with enterprise procedures • maintain security, integrity, traceability of samples, sub-samples, test data and results and documentation.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL974001A Prepare, standardise and use solutions*. Resources may include: • standard laboratory equipped with appropriate test equipment/instruments, standards and reagents • enterprise procedures and standard methods.
Method of assessment	The following assessment methods are suggested: • review of test data/results obtained by the candidate over a period of time to check accuracy, consistency and timeliness of results • review of test records and workplace documentation completed by the candidate • observation of candidate conducting a range of chemical tests and procedures and sample preparation • feedback from peers and supervisors • oral or written questioning of chemical principles and concepts, test methods and enterprise procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing**

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	Ultraviolet spectroscopy is a suitable method for determining the concentration of sulphanilamide in pharmaceutical preparations. The ultraviolet absorption spectrum is pH dependent, with the wavelength maximum different in acid and alkaline solutions. Example: a technician was conducting an analysis and noted that the wavelength maxima had moved from approximately 250nm to below 230nm. After reviewing the procedure being used and checking for possible errors, the technician found that an incorrect solvent had been used for the analysis. The hydrochloric acid solvent was replaced with sodium hydroxide, as per the standard method, and the correct absorption spectrum was obtained. **Environmental** A technician was asked to test water samples from a local lake over several days to determine the lake's nutrient levels following reports of algal blooms in the lake over the preceding weeks. He/she used a field colorimeter kit to determine both nitrates and orthophosphates using SOPs. Because the same colorimetric cells were used for the nitrate and orthophosphate tests, they were carefully washed and rinsed with distilled water between all tests (as specified in the SOP). After reviewing the results from the first three days, the technician noted that the first orthophosphate result, which was done immediately after all the nitrate tests, was much higher than subsequent orthophosphate tests which were all consistently low. The technician argued that the 'high' results for the first orthophosphate test may be due to cross-contamination from trace amounts of reagents used in previous nitrate tests despite having closely followed the cleaning/rinsing SOPs. After discussion with his/her supervisor, the technician modified the field procedures by using totally different colorimetric cells for the nitrate and orthophosphate tests. For all subsequent tests no 'high' orthophosphate results were obtained for the first sample. As a result, the laboratory supervisor amended the SOPs to incorporate this new requirement. **Food processing** Regular checks are conducted on the percentage of salt in cheese at a dairy company's laboratory. A technician checks the results from the airomatic salt-titration

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	equipment and, if the results are abnormal, notifies the supervisor before taking appropriate action. After obtaining a high result, for example, the assistant notified the supervisor and then began checking the machine to identify a possible reason for the high reading. He/she found that the supply bottle of silver nitrate used in the test was almost empty. This had resulted in less solution being pumped through the equipment than required, leading to graph readings that indicated a high percentage of salt. After replacing the silver nitrate bottle and recalibrating the equipment, the assistant retested the cheese samples and found that they contained the expected 1-2% salt.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 2134.1-1999 Recommended practice for chemical analysis by atomic absorption spectrometry - Flame atomic absorption spectrometry
	  • AS 2162.1-1996 Verification and use of volumetric apparatus - General - Volumetric glassware
	  • AS 3753-2001 Recommended practice for chemical analysis by ultraviolet/visible spectrophotometry

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RANGE STATEMENT	
	• AS ISO 1000-1998 The international system of units (SI) and its application • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories • AS/NZS 2243 Set:2006 Safety in laboratories set • AS/NZS ISO 9000 Set:2008 Quality management systems set • Australian code of good manufacturing practice for medicinal products (GMP) • calibration and maintenance schedules • enterprise recording and reporting procedures • equipment manuals • equipment startup, operation and shutdown procedures • industry methods, such as Royal Australian Chemical Institute (RACI) and/or American Association of Cereal Chemists (AACC) methods for inorganic constituents • material safety data sheets (MSDS) and safety procedures • material, production and product specifications • national measurement regulations and guidelines • principles of good laboratory practice (GLP) • production and laboratory schedules • quality manuals and equipment and procedure manuals • SOPs • waste minimisation and safe disposal procedures
Sample preparation processes	Sample preparation processes may include: • grinding • mulling • preparation of discs • digestion • dissolving • ashing • refluxing • tracting

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RANGE STATEMENT	
	• filtration • evaporation • flocculation • precipitation • washing • drying • centrifugation

Non-instrumental test/procedures	Non-instrumental test/procedures may include:
	• gravimetric analysis:
	  • loss on drying
	  • suspended solids
	  • ashes, such as sulphated and gravimetric assays (e.g. sulphates and nitrogen in fertilisers)
	  • Ni by dimethylglyoxime
	  • bitumen content of asphaltic concrete
	• titrimetric analysis:
	  • acid/base determinations
	  • complexiometric, such as water hardness, Fe by dichromate and binder content analysis
	  • redox, such as precipitation of chlorides in water
	  • dissolved oxygen (DO), chemical oxygen demand (COD) and biochemical oxygen demand (BOD)
	• filtration, separation and solvent extraction techniques
	• corrosion testing, cement content and accelerated weathering

Instrumental tests	Instrumental tests may include: • spectrometry • chromatography • electrochemistry
Types of instrumentation and instrumental techniques	Types of instrumentation and instrumental techniques may include: • colorimetric techniques, such as enzyme activity, chlorine in water, specific cations and anions

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RANGE STATEMENT	

	• infrared, ultraviolet-visible (UV-VIS) spectrophotometry
	• other spectrometric techniques:
	  • fluorimetric analysis, flame atomic emission and flame atomic absorption spectrometry
	  • fourier transform infrared
	• chromatographic techniques:
	  • column and thin layer analytical and preparative chromatography
	  • gas or liquid chromatography for purity, raw material and formulation checks
	  • ion chromatography for detection of nitrates, phosphates, sulphates, chlorides and bromides
	  • gel filtration chromatography for purification of proteins
	• electrochemical techniques, such as pH, eH, conductivity and ion-selective electrodes
	• electrophoretic techniques for DNA patterns and determination of protein purity
	• soil testing:
	  • moisture content
	  • organic matter content
	  • specific anions and cations
	• auto-analysers for determination of total P, total Kjeldahl N, orthophosphate, nitrite/nitrate and ammonia

Chemical principles and concepts	Chemical principles and concepts may include: • ions, atoms, molecules, bonding and links to chemical properties • chemical reactions involving acid/base, redox, complex ion formation, solubility and equilibrium • energy levels and absorption/emission spectra
Chemical tests methods	Chemical tests methods may include: • control of starting materials, in-process materials and finished products • environmental monitoring • basic troubleshooting and/or problem solving

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RANGE STATEMENT	
	within the scope of SOPs and enterprise processes

Hazards	Hazards may include:
	• chemicals:
	  • acids (e.g. sulphuric, perchloric and hydrofluoric)
	  • heavy metals and pesticides
	  • anions (e.g. fluoride)
	  • hydrocarbons (e.g. mono-aromatics)
	• aerosols from broken centrifuge tubes, pipetting
	• sharps and broken glassware
	• flammable liquids and gases
	• cryogenics, such as dry ice and liquid nitrogen
	• fluids under pressure, such as hydrogen in gas liquid chromatography, acetylene in atomic absorption spectrometry
	• sources of ignition
	• high-temperature ashing processes
	• disturbance or interruption of services

Hazard control measures:	Hazard control measures may include: • ensuring access to service shut-off points • recognising and observing hazard warnings and safety signs • labelling of samples, reagents, aliquoted samples and hazardous materials • handling and storage of hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions • identifying and reporting operating problems or equipment malfunctions • cleaning and decontaminating equipment and work areas regularly using enterprise procedures • using personal protective clothing and equipment, such as gloves, safety glasses and coveralls • using containment facilities (PCII, PCIII and PCIV physical containment laboratories), containment equipment (biohazard containers, laminar flow cabinets, Class I, II and III

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RANGE STATEMENT	
	biohazard cabinets) and containment procedures • reporting abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates to appropriate personnel
Records	Records may include: • test and calibration results • equipment use, maintenance and servicing history • faulty or unsafe equipment
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL974002A Conduct geotechnical site investigations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to prepare for and conduct and conclude site activities such as excavations, sampling and testing as part of a geotechnical investigation team. Personnel are expected to solve common site problems and seek advice to deal with situations beyond their own technical competence. This competency is typically performed by laboratory technicians working under the guidance of a geotechnical paraprofessional or engineer.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians working in the construction, mining and drilling industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		
	MSL973012A	*Assist with geotechnical site investigations*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for on-site operations	1.1. Identify the job, location, work instructions, appropriate sampling/test procedures and safety requirements 1.2. Identify site hazards and identify appropriate personal protective equipment and safety procedures that are specified for the job and materials used 1.3. Record description of the job to be undertaken, compare with specification and report any variations 1.4. Arrange for the collection, checking, stowing and transport of all tools, equipment and materials required at the site 1.5. Ensure site access requirements, such as entry permits and safety inductions have been organised

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ELEMENT	PERFORMANCE CRITERIA
2. Arrange excavation of boreholes, test pits and/or trenches	2.1. Identify the sampling/testing location 2.2. Excavate or oversee excavation to the sampling/testing depth, minimising disturbance and potential contamination of the site 2.3. Identify materials and record changes of strata, test results and other relevant information 2.4. Ensure materials from different strata are kept separate 2.5. Terminate the excavation at the appropriate depth and record the reason for termination
3. Conduct site sampling	3.1. Prepare and check sampling equipment and materials 3.2. Take disturbed and undisturbed samples in accordance with enterprise methods/procedures 3.3. Label and record samples in accordance with enterprise methods/procedures 3.4. Recognise and record details of site conditions that may impact on sample integrity or site interpretation
4. Conduct testing	4.1. Prepare and conduct pre-use checks of test equipment 4.2. Perform, or assist with performing, tests in accordance with test methods or enterprise procedures 4.3. Record test data in accordance with test methods or enterprise procedures 4.4. Recognise obvious errors or atypical data and take appropriate corrective actins
5. Finalise site operations	5.1. Backfill or seal any excavation and ensure that it is left in a safe and uncontaminated condition 5.2. Reinstate surfaces disturbed by sampling or testing 5.3. Clean all equipment (and vehicle, as necessary) avoiding environmental damage, stormwater contamination or spread of pests 5.4. Check all equipment/materials prior to re-stowing them for safe transport 5.5. Handle and transport samples in accordance with established practices 5.6. Notify appropriate site personnel on completion of investigations and prior to leaving site 5.7. On return to base, check serviceability of test equipment before storage

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ELEMENT	PERFORMANCE CRITERIA
6. Maintain records	6.1. Maintain equipment records in accordance with established practices 6.2. Complete site safety plans, equipment logs and test reports in accordance with enterprise procedures 6.3. Maintain confidentiality of enterprise information
7. Maintain a safe work environment	7.1. Use safe work procedures and protective equipment to ensure personal safety and that of others 7.2. Minimise environmental impacts of testing/sampling and generation of waste 7.3. Collect and/or dispose of all waste in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting maps, site plans and drawings
- identifying and locating site services, sampling and testing sites (e.g. global positioning system (GPS))
- setting up, checking, using and cleaning/maintaining tools and equipment
- taking representative samples, handling and transporting samples
- identifying soil, rock and fill materials
- observing, interpreting and reportingsite features and geotechnical conditions
- performing basic in situ tests and site measurements (e.g. location and depth)
- maintaining accurate and complete records
- communicating problems to appropriate personnel
- driving safely on and off-road
- working safely on construction sites aroundheavy equipment and earthmoving plant

Required knowledge

Required knowledge includes:

- the basic concepts, purposes and principles of geotechnical site investigation
- identification and classification of materials

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REQUIRED SKILLS AND KNOWLEDGE
• engineering properties of soil and rock materials • representative sampling and testing • uses of soil and rock materials in engineering and construction • insitu testing methods • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • identify and locate site services, sampling and testing sites and recognise site problems • use tools and equipment effectively and efficiently • collect representative samples and handle and transportthem correctly • record sampling and testing information • identify and describe materials accurately • observe, interpret and report geotechnical conditions • communicate problems to appropriate personnel and seek advice • record and communicate work results • work safely.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used. This unit of competency may be assessed with: • *MSL952002A Handle and transport samples or equipment* • *MSL954001A Obtain representative samples in accordance with sampling plan*

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EVIDENCE GUIDE	
	• *MSL973001A Perform basic tests*. Resources may include: • access to sites, tools and equipment • enterprise procedures, sampling plans, test methods and equipment manuals.
Method of assessment	The following assessment methods are suggested: • review of work outputs over a period of time to ensure accurate and consistent work is obtained within required timelines • examples of completed workplace documentation • feedback from peers and supervisors • oral or written questioning. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Construction materials** A geotechnical consultancy company is carrying out the investigation for the construction of an industrial complex involving building pads and roadways. A contract drilling company has been hired to carry out auger drilling for the building pad foundations. The drill rig will be used to perform standard penetration tests in some boreholes to determine bearing capacities. Undisturbed sample tubes will be pushed to obtain samples for consolidation testing in the laboratory.

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EVIDENCE GUIDE	
	A senior technician is in charge of site activities, and arranges for a drill rig. She/he plans a program of drilling, sampling and testing. A laboratory assistant is allocated to carry out the majority of site activities. These include overseeing drilling, testing and sampling operations. He/she is provided with a marked-up plan of the site showing borehole locations so that he/she can direct where to drill. The senior technician makes site visits every second day to oversee the work. The drilling contractor operates the drill rig, takes tube samples, performs the standard penetration tests and cases the hole if required, as directed by the senior technician. The assistant records and samples the soil profile, seals the sample tubes with wax and labels them. He/she also records the SPT readings and bags and labels the material from the split-spoon sampler. Each borehole is capped to prevent access by unauthorised persons so that the assistant can record standing water level 24 hours after the hole has been drilled. He/she wears a helmet, safety boots and earmuffs while working near the rig. He/she covers up and wears sunscreen while working in the sun and drinks large quantities of water. The assistant also excavates hand auger holes to a depth of one metre at regular intervals in the proposed roadways to obtain samples for California Bearing Ratio (CBR) tests. Adjacent to each, he/she performs a dynamic cone penetrometer test to two metres to assess the insitu material. He/she records the logs of the auger holes and the test results on the company's standard data sheets and backfills each auger hole immediately after sampling. He/she reports each day's activities to the senior technician using the company's standard summary form. He/she is confident to identify soil types thus minimising the need for laboratory testing of the samples taken. Based on the field logs, cross-sections of the site can be drawn so that the designer can assess its geotechnical characteristics and determine the extent of any further investigations.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • industry codes of practice • environmental legislation and regulations • standard operating procedures (SOPs) • equipment manuals • equipment startup, operation and shutdown procedures • calibration and maintenance schedules • quality manuals • enterprise recording and reporting procedures • production and laboratory schedules • material, production and product specifications
Site hazards	Site hazards may include: • solar radiation, dust and noise • manual handling of heavy materials and equipment • working in/on trenches, confined spaces, wet and uneven surfaces, heights and slopes • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • location of site services before investigations commence • use of material safety data sheets (MSDS) • use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls and safety boots • handling and storage of (hazardous) materials

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RANGE STATEMENT	
	and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning of equipment and vehicles • machinery guards • signage, barriers, flashing lights, traffic control
Tools and equipment	Tools and equipment may include: • hand tools, including shovels, crowbars, scoops, spanners, wrenches and tape measures • consumables, including sample bags, labels, sample tubes and wax • documentation, including maps, plans and worksheets • field test equipment, including dynamic cone penetration (DCP) testing, standard penetration testing (SPT), shear vane, pocket penetrometers and water level indicator • safety clothing and equipment, including helmet, boots, gloves, earmuffs and glasses • excavation equipment, including hand and power augers
Common site problems	Common site problems may include: • caving of the excavation • drilling difficulties • not knowing the requirements of the design engineer • not understanding the nature of the item being designed (e.g. retaining wall, piled structure and earthworks) • sample loss during retrieval • knowing when to stop a hole, or what and when to test and sample • misidentification of samples and sampling locations • equipment breakdown and breakage • environmental problems and issues, including site access, inclement weather, traffic, wildlife, vegetation and construction activities
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise

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RANGE STATEMENT	
	OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL954001A Obtain representative samples in accordance with sampling plan

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to obtain a range of samples that are representative of the source material (e.g. raw ingredients, product in process and final product) and to prepare the samples for testing. All sampling activities are conducted in accordance with a defined sampling plan. This unit does not cover the subsequent testing of the samples.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory technicians in all industry sectors. It involves: • a range of sampling plans, samples and sampling procedures, which apply to the enterprise site, plant laboratory or field sites • enterprise products/materials and hazardous materials • a range of sampling points and/locations. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare for sampling	1.1. Confirm the sampling location, number and type of samples, and timing and frequency of sampling from enterprise or client's sampling plan 1.2. Liaise with relevant personnel to arrange site access and, if appropriate, all necessary clearances and/or permits 1.3. Select sampling equipment and conditions to achieve representative samples and preserve sample integrity during collection, storage and transit 1.4. Check that all procedures are in accordance with client or enterprise requirements, relevant standards and codes 1.5. Identify site and sampling hazards and review enterprise safety procedures

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ELEMENT	PERFORMANCE CRITERIA
	1.6. Assemble and check all sampling equipment, materials, containers and safety equipment 1.7. Arrange suitable transport to, from and around site as required
2. Conduct sampling and log samples	2.1. Locate sampling sites and, if required, services at the site 2.2. Conduct representative sampling in accordance with sampling plan and defined procedures 2.3. Record all information and label samples in accordance with traceability requirements 2.4. Record environment or production conditions and any atypical observations made during sampling that may impact on sample representativeness or integrity 2.5. Transport all samples back to base according to standard operating procedures (SOPs) and relevant codes
3. Prepare samples for testing	3.1. Prepare sub-samples and back-up sub-samples that are representative of the source 3.2. Label all sub-samples to ensure traceability and store in accordance with SOPs 3.3. Follow defined preparation and safety procedures to limit hazard or contamination to samples, self, work area and environment 3.4. Distribute sub-samples to defined work stations maintaining sample integrity and traceability requirements
4. Address client issues	4.1. Enter approved information into laboratory information management system (LIMS) 4.2. Report all relevant aspects of the sampling and preparation phases in accordance with enterprise procedures 4.3. Ensure that information provided to client is accurate, relevant and authorised for release 4.4. Maintain security and confidentiality of all client/enterprise data and information
5. Maintain a safe work environment	5.1. Clean all equipment, containers, work area and vehicles according to enterprise procedures 5.2. Check serviceability of all equipment before storage 5.3. Use defined safe work practices and personal protective equipment to ensure personal safety and that of other laboratory personnel

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ELEMENT	PERFORMANCE CRITERIA
	5.4. Minimise the generation of wastes and environment impacts 5.5. Ensure the safe collection of all hazardous wastes for appropriate disposal

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • collecting representative samples in accordance with a sampling plan • techniques to preserve the integrity of samples • identifying atypical materials and samples and taking appropriate action • maintaining sampling equipment • completing sampling records • working safely • following requirements for the disposal of waste and the preservation of the environment
Required knowledge
Required knowledge includes: • principles of representative samples • principles and procedures for random, systematic and stratified sampling, consistency of sampling procedures • preservation of the integrity of samples • maintaining identification of samples relative to their source • enterprise and/or legal traceability requirements • cost effectiveness of sampling • characteristics of product/material to be sampled and likely contaminants • links between quality control, quality assurance, quality management systems and sampling procedures • enterprise procedures dealing with legislative requirements for the handling, labelling and transport of hazardous goods • links between correct occupational health and safety (OHS) procedures and personal and environmental safety particularly at high risk sites

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REQUIRED SKILLS AND KNOWLEDGE
Specific industry Additional knowledge requirements may apply for different industry sectors. For example:Biomedical and environmental services: • specific legislation on biohazards • documentation procedures for the chain of custody for samples to be used as evidence or for blood transfusion

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • collect the specified quantity of sample to enable all processing and testing to occur and back-up samples to be stored • obtain a sample that is representative of the bulk material • preserve the integrity of samples by closely adhering to procedures • label samples and sub-samples to satisfy enterprise/legal traceability requirements • identify atypical materials and samples and take appropriate action • maintain sampling equipment in appropriate condition • complete sampling records using enterprise procedures • follow safety regulations and enterprise OHS procedures during sampling, transport and storage • follow relevant legislative requirements for the disposal of waste and the preservation of the environment.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment.

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EVIDENCE GUIDE	
	This unit of competency may be assessed with: • *MSL924001A Process and interpret data* • *MSL943002A Participate in laboratory/field workplace safety* • *relevant MSAL974000 series units of competency* • *relevant MSAL975000 series units of competency relevant to the sampling*. Resources may include: • variety of sample types • sampling plans • a selection of sampling containers and sampling equipment.
Method of assessment	The following assessment methods are suggested: • inspection of samples collected by the candidate • review of sampling documentation completed by the candidate • feedback from peers, customers and supervisors that sampling plans were followed • questioning to assess underpinning knowledge of representative sampling procedures • observation of the candidate taking a range of samples. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace

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EVIDENCE GUIDE	
	setting. **Manufacturing** A metallurgical laboratory technician is very familiar with preparing representative samples for a range of final products in a steelmaking plant. One day, he/she is asked to sample a 50 tonne small-particle coal delivery which is believed to have a higher than acceptable sulphur content. Having never prepared representative samples for such a large quantity of material, the technician consulted their supervisor and developed an appropriate sampling plan. The technician arranged for the operator of a small front-end loader to take buckets of coal from five equally spaced points around the pile. The resulting material was then combined and mixed in one heap. The technician coned and quartered the heap enough times to obtain a representative sample of about 5kg. He/she arranged for the unwanted material to be returned to the stockpile. On return to the laboratory, the technician crushed the sample and repeatedly coned and quartered the material to obtain an analytical portion. **Environmental** A field technician trained in sampling natural water systems is asked to sample a bright yellow industrial wastewater discharge into a small creek. The relevant sampling plan specifies that the samples should be collected where the waste water is well mixed near the centre of the creek and at the mid-depth point. The technician also notes that the samples must be collected where turbulence is at a maximum so that the settling of solids is minimal. On arrival at the site, the technician locates where the wastewater is entering the creek. He/she moves downstream to where the waste water and creek water is well mixed and there is little apparent loss of the yellow suspended solids. The technician dons the required personal protective equipment and uses a convenient bridge to collect a set of six samples and duplicates over a half-hour period using the equipment and procedures specified in the sampling plan. Using a field notebook, the technician records all information specified in the laboratory's chain of custody requirements and safety plan for handling potentially hazardous industrial waste.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS 1199 Sampling procedures and tables for inspection by attributes
	  • AS 1678 Emergency procedure guide -Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS 4433.2-1997 Guide to the sampling of particulate materials - Preparation of samples
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	• American Association of Cereal Chemists (AACC) Approved Methods of Analysis
	• Australian Dangerous Goods Code
	• enterprise and/or client sampling schemes and sampling plans
	• enterprise recording and reporting procedures
	• gene technology regulations
	• material safety data sheets (MSDS)
	• methods and procedures which may be written to meet enterprise, client and/or regulatory/certifying body requirements
	• National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)]
	• site plans, maps and specifications

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RANGE STATEMENT	
Basic principles of sampling	Basic principles of sampling include: • representative samples • preservation of integrity of samples • maintaining identification of samples relative to their source, enterprise and legal traceability • cost-effectiveness of sampling • consistency of sampling procedures • sampling principles, including random, systematic and stratified sampling
Materials sampled	Materials sampled may include: • gas or air samples • liquid samples, such as water, groundwater, waste water, stormwater, sludges and sewage • solid samples, such as soil, sediments, rocks, concrete, quarry and mining material • solid wastes • raw materials, start, middle, end of production run samples, final products and materials used in production processes, such as flocculants • plants • animals • microbiological samples
Types of samples	Types of samples may include: • grab samples • composite samples • quality control samples • research or one-off samples • environmental or survey samples
Sampling tools and equipment	Sampling tools and equipment may include: • shovels, augers and chain saws • sampling frames, sampling tubes, dip tubes, spears, flexible bladders and syringes • front-end loader, backhoe, excavator and drill rig • sample bottles or containers, plastic containers and disposable buckets • access valves • sample thief • auto samplers

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RANGE STATEMENT	
	• pumps and stainless steel bailers • traps and cages • sterile containers, pipettes, inoculating loops and disposable spoons
Maintenance of integrity of samples	Maintenance of integrity of samples may include: • use of compatible container, such as glass, plastic, amber and opaque bottles • use of appropriate preservatives, such as sodium azide, toluene or antibiotics • decontamination of sampling tools between collection of consecutive samples • wrapping container in foil • purging of sample lines and boxes • handling and transport to avoid disturbance or damage • temperature control which may involve insulation of sample without direct contact with the coolant • wrapping in wet newspaper, cloth, sand or sawdust • transfer of sterile sample into sterile container • monitoring of storage conditions
Site and sampling hazards	Site and sampling hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as micro-organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • chemicals, such as acids and hydrocarbons • aerosols • sharps and broken glassware • manual handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery and hand tools • vehicular and pedestrian traffic
Safety procedures	Safety procedures may include: • use of MSDS

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RANGE STATEMENT	
	• use of personal protective equipment, such as hard hats, hearing protection, gloves, safety glasses, goggles, face guards, coveralls, gowns, body suits, respirators and safety boots • use of biohazard containers and laminar flow cabinets • correct labelling of reagents and hazardous materials • handling, and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning and/or decontaminating equipment and work areas • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lockout and tag-out procedures
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL924002A Use laboratory application software

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to use and apply computer application software in the laboratory, field and production plants for analysis and reporting.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical officers and laboratory technicians in all industry sectors. It describes the application and use of software packages in the context of laboratory or field work. Typically this software would be for the storage, retrieval, analysis and display of information. There is no expectation that candidates would be able to customise the software to meet specific needs. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Access application software	1.1. Identify software required for the task 1.2. Open software from a personal computer or network terminal
2. Use software for specified purposes	2.1. Input a range of scientific data into a computing system 2.2. Conduct searches for the retrieval of required data 2.3. Use application features for efficient computation 2.4. Construct data sets and databases for numerical and graphical analyses
3. Produce reports of retrieved data and/or processed data	3.1. Analyse data using features of the software package 3.2. Select options for constructing data reports 3.3. Print the results of data analyses using features of the software package 3.4. Integrate data from diverse application software

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ELEMENT	PERFORMANCE CRITERIA
	units in a report 3.5. Report the outcomes and rationale for computerised database searches where appropriate 3.6. Reference computerised data sources according to the style requirements of the enterprise
4. Perform simple record housekeeping	4.1. Backup worked data according to enterprise standard procedures 4.2. Maintain archive data according to enterprise standard procedures 4.3. Maintain hard copy data according to standard enterprise operating procedures 4.4. Apply approved antivirus software and general standard quarantine procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • using software application features and instructions to input, save, analyse, sort, retrieve and display the records or data • using software for the analysis, reporting and management of laboratory and field data and information • using in-house software manuals to augment skills and solve operational problems • selecting the most appropriate software package for the task • backing up electronic storage • using scanning software to protect in-house software and data
Required knowledge
Required knowledge includes: • applications of the software package • terminology associated with the software packages • basic knowledge of the types of spreadsheet, database, data analysispackages that are available • application ofspecific software package features torelevantlaboratory tasks

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REQUIRED SKILLS AND KNOWLEDGE
• relationship between the protocol for data input and file storage of the data • general file and record maintenance • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • select the most appropriate software package for the task from the suite of software applications available • use routine instruction sets of the software package to complete the task • use software to analyse data such as quality control and instrument performance characteristics • back up electronic storage • use scanning software to protect in-house software and data.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL925001A Analyse data and report results* • *relevant MSL974000 series units of competency* • *relevant MSL975000 series units of competency*. Resources may include: • access to a computer network or a personal computer • software packages that include a database package, spreadsheet, statistical analysis and simple graphics output • input and output data.
Method of assessment	The following assessment methods are suggested: • review of analysis tasks linking test results to the

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EVIDENCE GUIDE	
	generation of meaningful reports by the candidate • review of simple statistical and/or graphical analysis of quality control data completed by the candidate • oral and written exercises in preparation for keyboard activities. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Manufacturing** A laboratory technician performs tests on starting materials, such as appearance, identity, melting point, moisture content, trace elements, sulfated ash and assay. The results are entered in a computer database that allows trend analysis to be carried out on the test results for materials from each supplier. As a result, the technician may recognise when a supplier is experiencing potential problems with their production process. The technician would then notify the supervisor and/or supplier that there is a high probability that future supplies may be out of specification and that constant monitoring of starting materials will be required. **Biomedical** An important task of the technical officer in a pathology laboratory is to perform statistical analysis for quality control purposes. The software package provides for the input of data, analysis of mean value and variance as well

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EVIDENCE GUIDE	
	as graphical reporting. The technical officer uses a dedicated software package or a package within the customised pathology data management system in order to assess the validity of the results produced from the analytical instrument. **Food processing** A technical officer is required to perform a nutrient analysis of a food product, the results of which will be displayed on the food container. The output from the nutrient analysis is fed into a software program that calculates the levels of these components 'per portion' and 'per 100g' and displays the information in the correct tabular format. The software package is designed so that the technical officer can input new data or access existing data and manipulate that data to provide a full and accurate nutrient display or report.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used
Information sources	Information sources may include: • manuals of enterprise standard instructions • hardware manuals • software manuals • training materials to orient software to enterprise needs • on-screen instructions embedded in the software
Software packages	Software packages may include:

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RANGE STATEMENT	
	• word processing • spreadsheets • databases • graphical and statistical analysis • laboratory information systems
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Data

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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Co-requisite units		

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MSL904001A Perform standard calibrations

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to calibrate test and measurement equipment in accordance with standard calibration procedures and documented test methods. These procedures/methods specify all associated reference standards, materials, equipment and methods to be used and the required parameters or quantities and ranges to be tested, including the criteria for rejection or approval.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory and calibration technicians who carry out tests and/or calibrations using standard calibration methods in first, second and third party laboratories, and laboratories where testing and/or calibration forms part of inspection or product certification. Personnel are not permitted to deviate from explicit instructions in any manner, modify the procedure, nor substitute alternative equipment. They work under limited supervision and results of their work are interpreted and checked by the laboratory supervisor, quality inspector or designated signatory. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Prepare items for calibration	1.1. Select the authorised calibration procedure in accordance with enterprise procedures 1.2. Identify hazards and use appropriate personal protective equipment, safety equipment and procedures 1.3. Confirm all measuring equipment meets the laboratory's specification requirements and complies fully with the calibration procedure 1.4. Assemble and set up specified reference standards and associated equipment prior to testing

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Verify performance of reference standards and measuring equipment prior to use and adjust or calibrate as necessary 1.6. Identify and minimise potential sources of measurement error
2. Perform calibration	2.1. Perform individual tests without variance according to the documented procedure to ensure repeatability of measurement 2.2. Confirm readings are the result of a valid measurement and record data as required (as-found or before adjustment) 2.3. Adjust device under test to bring readings within specification and record data (as-left or after adjustment) if required 2.4. Analyse resulting test data to detect trends or inconsistencies that would significantly affect the accuracy or validity of test results 2.5. Seek appropriate advice when interpretation of results is outside authorised scope of approval
3. Document results	3.1. Document compliance/non-compliance with requirements of test and/or specifications 3.2. Estimate and document uncertainty of measurement in accordance with enterprise procedures, if required 3.3. Record the results of each test/calibration accurately, unambiguously and objectively 3.4. Ensure confidentiality of enterprise information
4. Finalise calibration	4.1. Prepare and issue a final report on the job/item detailing testing carried out, traceability, statement of compliance and relevant information as required 4.2. Report any non-compliance and verify next course of action with supervisor 4.3. Attach calibration labels, equipment stickers, quality control tags and tamper resistant seals as required in enterprise procedures 4.4. Store test equipment/measurement standards and results in accordance with enterprise procedures

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- selecting and applying appropriate test methods and calibration procedures
- maintaining close attention to procedures, accuracy and precision of measurement to ensure the integrity of test/calibration results
- using calibration and correction charts
- calculating to give results in appropriate accuracy, precision and units
- preparing test/calibration documentation that is accurate and complies with requirements
- operating equipment correctly and safely
- recognising problems or departures in systems and documentation and initiating actions to prevent or minimise them
- recognising and report opportunities for improvements to procedures

Required knowledge

Required knowledge includes:

- purpose of metrology and calibration, including common terminology, concepts, principles, procedures, and applications
- National Association of Testing Authority's (NATA) and National Measurements Institute's (NMI) role in the measurement and testing system in Australia
- traceability, including legal requirements for traceability
- requirements for the competence of testing and calibration laboratories (e.g. AS ISO/IEC 17025) as they affect job role and responsibilities
- hierarchy and appropriate selection of reference materials and instruments
- non-conformance/non-compliance procedures and protocols associated with equipment, reference material and calibration procedures
- troubleshooting procedures for equipment and test methods
- methods for statistical analysis (means, ranges and standard deviations) and estimation of uncertainty of measurement (may include the use of software)
- reporting procedures and legislative requirements
- handling, transport, storage and operation of reference and working standards
- laboratory environmental control requirements
- relevant health, safety and environmental requirements
- layout of the enterprise, divisions and laboratory
- organisational structure of the enterprise
- lines of communication
- role of laboratory services for the enterprise and customers

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REQUIRED SKILLS AND KNOWLEDGE
Specific calibration fields Additional knowledge requirements may apply for different calibration fields. For example, testing and calibrations conducted in the following: • acoustic and vibration measurement • chemical testing • construction materials testing • electrical testing • heat and temperature measurement • mechanical testing • metrology • non-destructive testing • optics and radiometry • pressure measurements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • maintain very close attention to procedures, accuracy and precision of measurement to ensure integrity of test/calibration results (especially during lengthy tests) • critically examine each calibration step to ensure repeatability and validity of data • apply all relevant procedures and regulatory requirements to ensure the quality and integrity of the services or data provided • prepare test/calibration documentation that is accurate and complies with requirements • operate equipment correctly and safely • recognise problems or departures in systems and documentation and initiate actions to prevent or minimise them

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EVIDENCE GUIDE	
	• recognise and report opportunities for improvements to procedures.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL924001 Process and interpret data* • *relevant MSL974000 series unit of competency* • *relevant MSL975000 series unit of competency*. Resources may include: • specialised calibration/test equipment, reference standards and laboratory facilities • access to a library of calibration methods, procedures and equipment specifications • enterprise quality manual and procedures.
Method of assessment	The following assessment methods are suggested: • review of calibration results, uncertainty calculations and workplace documentation completed by the candidate • feedback from supervisors and/or customers regarding quality of calibration services provided by the candidate • observation of the candidate performing standard calibrations • oral or written questioning to check underpinning knowledge of standard calibration procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.

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EVIDENCE GUIDE	
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Background** Calibration work may be simple or highly complex depending upon the type of equipment being calibrated and the accuracy or uncertainties required. Manual calibrations may involve interconnecting equipment and setting the stimulus devices to the settings listed in the procedure. At each setting, the technician must verify that the response or output of the unit under test (UUT) is within the tolerances specified in the procedure. In addition, many procedures require that 'as-found' (before adjustment) and 'as-left' (after adjustment) results are recorded for maintaining the UUT documentation history. Often calibration technicians must assess and document the total uncertainties for a given measurement by analysing equipment specifications and methodology during calibration. They have to interpret specifications and technical information and demonstrate initiative when adjusting and repairing instruments. The calibration technician's workload can be routine and repetitive. A perpetual backlog of work and the constant need to reduce turn-around-time to meet client demands, coupled with enterprise productivity goals, can induce stress and mental fatigue if not carefully managed. However, it is essential that all personnel are able to perform tests and associated work tasks without undue pressure that might influence technical judgement if 'integrity of measurement' is to be retained. Errors arising from items incorrectly calibrated will, at best, have to be recalled which wastes time, resources and destabilises enterprise credibility. At worst, if undetected, they may have severe safety implications to personnel or equipment, depending on the nature of the item. **Calibration (1)** A customer delivers a test pressure gauge and requires certification that the gauge conforms to manufacturer's specifications. Personnel in the item reception area log the job and the laboratory supervisor assigns it to a calibration technician. He/she reads the work order and

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EVIDENCE GUIDE	
	retrieves the approved calibration procedure. The procedure requires the customer's gauge to be tested to 1000 kPa using a hydraulic test station. The technician assembles the required apparatus and personal protective equipment. The gauge is visually inspected for defects and contamination. The temperature of the environment is checked and the hydraulic test station confirmed as fully operational. The required pressures are applied to the gauge and the indicated readings are transcribed onto the test report. The technician notes that some readings are outside the allowable tolerance and adjustments will have to be made. He/she takes another set of readings after making the necessary adjustments and records them on the report. The technician applies the required labels to the gauge, updates the database, produces a test report and places the item on the quality assurance bench for inspection by the supervisor. The supervisor visually inspects the item and checks the readings on the report. The job has taken two hours to complete. **Calibration** (**2**) A client has asked the laboratory to calibrate a spectrum analyser to manufacturer's specification. The supervisor assigns the job to a calibration technician who reads the job sheet and locates the appropriate calibration procedure. Although this spectrum analyser will be calibrated partly with the aid of automated technology, the technician estimates that the calibration will still take about nine hours to complete. The technician reads the procedure and assembles the equipment and allows for the required warm-up time for instrument stabilisation. Possible sources of error are minimised by cleaning connectors and tensioning them with the torque spanner. The technician performs the manual phase of the test and manually records 12 pages of results. The equipment is reconnected for the automated part of the procedure the test recommenced. The technician produces a further six pages of results. These are assessed for errors and non-conformances and all calculations are carefully checked. A final report is produced which accompanies the spectrum analyser to the quality assurance bench for checking by the supervisor. All cables and equipment used for the calibration are returned to the store.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise procedures may include:
	• Australian and international standards, such as:
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 9001:2008 Quality management systems - Requirements
	  • AS/NZS ISO 10005:2006 Quality management systems - Guidelines for quality plans
	  • AS/NZS ISO 10012:2004 Quality assurance requirements for measurement equipment
	  • ISO 5725 Accuracy (trueness and precision) of measurement methods and results
	  • ISO/IEC Guide 98-3:2008 Uncertainty of measurement - Part 3 Guide to the expression of uncertainty in measurement (GUM)
	• Eurachem/CITAC Guide CG4 Quantifying uncertainty in analytical measurement
	• material safety data sheets (MSDS)
	• enterprise recording and reporting procedures and standard operating procedures (SOPs)
	• quality manuals, equipment and operating/technical manuals
	• test methods and calibration procedures (validated and authorised)
	• test methods and calibration procedures

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RANGE STATEMENT	
	published by international, national or regional standards, reputable technical organisations, scientific texts or journals and equipment manufacturers • incident and accident/injury reports • schematics, work flows, laboratory layouts and production and laboratory schedules
Standard calibrations	Standard calibrations may include testing and/or calibrating the following equipment and reference materials using standard methods and procedures: • test equipment, such as anemometers, balances, barometers, calipers, environmental chambers, hygrometers, manometers, masses, micrometers, pressure equipment, spectrophotometers, tape measures, rules, temperature (digital) indicating systems, thermometers, thermocouples, timing devices, vibration analysis equipment and weighing instruments • electrical reference standards, such as air-lines, analogue meters, attenuators, bridges-manual balance, capacitors, DC voltage references, digital instruments (calibrators, DMMs, electronic transfer standards), inductors, instrument and ratio transformers, instrument transformer test sets, potentiometers, resistors, radio frequency (RF) power meters, RF thermistor mounts and thermal converters, shunts, time interval and frequency standards, transfer standards AC-DC, voltage dividers, volt ratio boxes and watt-hour references • working standards, instruments and testing equipment, such as electromagnetic compatibility (EMC) test equipment, field strength meters, flammability test equipment, gauges/test fingers/test pins, hipot testers, impact hammers, impulse testers, instrument calibrators, network analysers, signal generators and spectrum and harmonic analysers
Hazards	Hazards may include: • electric shock • disturbance or interruption of services

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RANGE STATEMENT	
	• manual handling of heavy equipment boxes • sources of electromagnetic radiation (lasers and RF generators/transmitters) • fluids under pressure • heat sources, such as ovens
Safety procedures	Safety procedures may include: • use of personal protective equipment, such as hearing protection, gloves, safety glasses and coveralls • ensuring access to service shut-off points • handling and storing hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, and enterprise procedures and regulations • regular cleaning of equipment and work areas
Reference materials	Reference materials may include: • colour standards • graded granular materials • hardness blocks
Communication	Communication may be with: • supervisors and managers (laboratory, quality and customer service) • peers and other laboratory or relevant technical personnel • clients and end users of equipment • external auditors, or accreditation agency for example, NATA • manufacturers of equipment and suppliers of spare parts and materials
Working environment	The working environment will have a controlled environment but may include: • purpose-built designed facility • mobile facility in the field
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these

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RANGE STATEMENT	
	requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Calibration

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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BSBOHS406C Use equipment to conduct workplace monitoring

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to accurately use equipment to contribute to the monitoring of agents and/or conditions in the workplace including, but not be limited to noise, vibration, light, fibres, dusts, fumes, mists, heat and humidity, radiation, and biological agents such as insects, mites and bacteria. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to individuals who contribute to the monitoring of agents and/or conditions in the workplace by using a range of measuring devices to identify hazards, assess risk and monitor the effectiveness of risk controls. Measurement of ergonomic factors and their impact on the human body has been excluded from this unit. This unit does not extend to interpreting results and developing control measures based on the outcomes of the monitoring, as this is addressed in BSBOHS404B Contribute to the implementation of strategies to control OHS risk.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Select measuring device/s	1.1. Identify ***agent and/or condition*** to be measured through consultation with workplace and affected parties 1.2. Identify ***characteristics*** of agent and/or condition 1.3. ***Define area*** where measurements are to be taken 1.4. Identify types of appropriate measuring equipment 1.5. Select measuring equipment appropriate to the agent and/or condition, the environment, the activities being carried out and the level of risk 1.6. Recognise limits of own expertise and available equipment, and seek expert advice and equipment as appropriate
2. Prepare to collect workplace	2.1. Identify any ***regulatory requirements and/or***

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ELEMENT	PERFORMANCE CRITERIA
information and data	***standards*** that impact on the measuring process 2.2. Define ***a sampling process*** 2.3. Make arrangements with the workplace to collect ***information and data*** including advising those involved in workplace activities of any requirements 2.4. Define sampling plan after inspecting area, and in consultation with employees and affected parties regarding the nature of the problem 2.5. Check ***operability of equipment***
3. Use devices to collect workplace information and data	3.1. Select and calibrate monitoring equipment, and select appropriate scale 3.2. Conduct tests or practice using equipment or tests 3.3. Use and maintain equipment correctly to accurately collect information and data 3.4. Address own occupational health and safety (OHS) while collecting information and data 3.5. Collect information and data, and record readings utilising professional evaluation and advice as appropriate 3.6. Dismantle and clean equipment and parts or dispose of appropriately 3.7. Correctly store equipment or make ready for re-use as appropriate
4. Document and evaluate results of monitoring	4.1. Interpret and evaluate results against a recognised standard, and document results 4.2. Address, in the report, any regulatory requirements and consider ***purpose of report*** and the ***target audience*** 4.3. Present ***required information and data*** clearly and logically 4.4. Retain and store results and records in a format that enables them to be readily retrieved in accordance with regulatory requirements and/or standards

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.

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REQUIRED SKILLS AND KNOWLEDGE

Required skills

- literacy skills to prepare reports for a range of target groups
- organisational and time management skills to sequence tasks and meet timelines
- research and data analysis skills to assess resources required to systematically manage OHS and to analyse relevant workplace information and data
- research and data analysis skills to evaluate interactions between employees, their activities, equipment, environment and work systems
- technology skills to access internal and external OHS data
- evaluation skills to systematically manage required OHS resources and where appropriate access these resources
- analysis skills to evaluate relevant workplace information and data and to recognise limitations of data
- numeracy skills to carry out simple arithmetical calculations and to produce graphs of workplace data to identify trends
- technical skills to use basic measuring equipment and to read scales and dials applicable to selected hazards
- analysis skills to interpret results from workplace measurements
- maintenance skills to maintain equipment used for workplace monitoring
- investigate skills to recognise that health effects could be due to microbiological hazards and the need to refer to specialist advice and support.

Required knowledge

- basic physiology relevant to understanding mode of action of physical, biological and chemical agents on the body and how they produce discomfort or harm
- characteristics, mode of action and units of measurement of major hazard types
- environmental conditions that impact on measurements
- exposure standards, their limitations and their practical use
- mathematical knowledge of units of measurement, logarithmic scales, decimals and order of magnitude relevant to making and interpreting measurements and measurement error
- nature of workplace processes (including work flow, planning and control) and hazards relevant to the particular workplace
- requirements for individual fitting, use, maintenance and storage of a range of OHS equipment
- requirements for reporting under OHS and other relevant legislation including obligations for notification and reporting of incidents
- requirements for work permits/written authorities when conducting workplace monitoring activities
- requirements under hazard specific OHS legislation and codes of practice
- sampling techniques and developing valid sampling process
- state/territory and commonwealth OHS legislation (acts, regulations, codes of practice, associated standards and guidance material) including prescriptive and

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REQUIRED SKILLS AND KNOWLEDGE
performance approaches, and links to other relevant legislation such as industrial relations, equal employment opportunity, workers compensation, rehabilitation • types of and techniques for correct use of intrinsically safe measuring and monitoring equipment including calibration, adjustment and maintenance, alarms and limitations on use and output • requirements for record keeping that addresses OHS, privacy and other relevant legislation.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • accurate use of appropriate equipment to monitor selected agents and/or conditions in the workplace • knowledge of relevant legislation, acts, regulations, codes of practice, associated standards and guidance material specific to measuring processes to identify hazards, assess risk and monitor the effectiveness of risk controls.
Context of and specific resources for assessment	Assessment must ensure: • access to a workplace or a simulated workplace with hazards requiring testing and monitoring • access to appropriate office and workplace equipment and resources • access to relevant legislation, standards and guidelines.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • analysis of responses to case studies and scenarios • demonstration of techniques used to measure and monitor workplace hazards • direct questioning combined with review of

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EVIDENCE GUIDE	
	portfolios of evidence and third party reports of on-the-job performance by the candidate • oral or written questioning to assess knowledge of techniques for correctly using intrinsically safe measuring and monitoring equipment • review of documented results • review of reports on testing undertaken • evaluation of equipment operability.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example: • BSBOHS404B Contribute to the implementation of strategies to control OHS risk.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Agent and/or condition may include:	• real or potential hazard to be monitored and may include, but is not be limited to: • biological agents such as insects, mites and bacteria • electricity • fibres, dusts, particulates • fumes, mists, gases, vapours • heat and humidity • light • noise • radiation (ionising, non-ionising, laser) • vibration
Characteristics may include:	• dose factors relating to concentration and time • how an agent affects specific parts of the body, such as extent of damage to tissue and/or

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RANGE STATEMENT	
	effects such as additive, antagonistic, synergism and potentiation • how an agent is absorbed into the body • way an agent behaves in the environment, including over distance and time
Defining the ***area*** where measurements are to be taken may include:	• area/space available • location • movements of people and equipment • number of persons occupying area • other factors that may impact on the sampling or data collection processes • physical features of equipment, such as emitting sources • tasks/activities being undertaken
Regulatory requirements and/or standards may include:	• Australian and international standards, such as those produced by Standards Australia and the Australian Safety and Compensation Council • biological exposure indices • exposure standards for atmospheric contaminants in occupational environments • guidance material such as guidance notes, guides, fact sheets, model regulations and technical reports that provide practical guidance and directions for hazard control • material safety data sheets (MSDSs) • state/territory and commonwealth OHS legislation, regulations and codes of practice, including those relating to specific hazards
Sampling process may include:	• other practical and financial considerations • process, substance or hazard event likely to be causing the ill health or symptoms • size of the workforce (i.e. individual worker or group/s of workers) • type of exposure
Information and data collected may include:	• conditions such as activities and number of people present when measurements were made • date, time and duration of collection • locations where information and data was collected • readouts/measurements taken • sampling method (e.g. grab, longitudinal, continuous)

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RANGE STATEMENT	
	• specifications of equipment used
Operability of equipment may include:	• availability of appropriate attachments, leads, filters etc • battery serviceability checks • check and function tests • National Association of Testing Authorities (NATA) tested and certified, with certificate of currency as appropriate
Purpose of report may include:	• as a basis for design of improved and/or new control measures • hazard identification • legal compliance • risk assessment
Target audience may include:	• designers and engineers • management • OHS committee or OHS representatives • OHS or environmental regulatory bodies • OHS professionals

Required information and data may include:	• agent/condition being monitored and key issues associated with the agent/condition
	• evaluation of results with reference to appropriate standards
	• interpretation and discussion of results
	• sampling process:
	  • conditions at time of sampling, including whether the sampling period represented normal operating conditions
	  • how measurements were taken
	  • locations where samples were taken
	  • specifications of equipment used
	• table of results
	• target audience for report
	• where, when and why measurements were taken

Unit Sector(s)

Unit sector	

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Competency field

Competency field	Regulation, Licensing and Risk - Occupational Health and Safety

Co-requisite units

Co-requisite units		

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MSL952001A Collect routine site samples

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to collect samples at field or production sites using specified equipment and standard or routine procedures.

Application of the Unit

Application of the unit	This unit of competency is applicable to production operators, field assistants and laboratory assistants in all industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for sampling	1.1. Confirm the purpose, priority and scope of the sampling request 1.2. Liaise with relevant personnel to arrange site access and all necessary clearances/permits 1.3. Identify site hazards and review enterprise safety procedures 1.4. Confirm what samples are to be collected, from where, how and when 1.5. Assemble all specified sampling equipment, safety equipment, materials and containers 1.6. Conduct pre-use and cleanliness checks of all items to ensure they are fit for purpose 1.7. Check all items against given inventory and stow them to ensure safe transport
2. Conduct sampling	2.1. Locate sampling points and services at the site 2.2. Remove security devices, such as locks and covers as required 2.3. Seek advice if the required samples cannot be collected or if procedures require modification 2.4. Select and use required sampling equipment in accordance with given procedures 2.5. Closely follow sampling procedures to obtain required samples and maintain their integrity

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ELEMENT	PERFORMANCE CRITERIA
	2.6. Record all labelling information in accordance with enterprise/legal traceability requirements 2.7. Record sample appearance, environmental conditions and any other factors that may impact on sample integrity 2.8. Replace security devices, such as locks and covers as required
3. Finalise sampling	3.1. Follow enterprise procedures for the cleaning/decontamination of equipment and vehicle as necessary 3.2. Check all equipment, materials and samples against inventory and stow for safe transport 3.3. Liaise with relevant personnel to restore normal production and/or services as necessary 3.4. Maintain integrity of samples during transportation 3.5. Deliver samples to the required collection point and complete all documentation to ensure traceability 3.6. On return, check and document serviceability of equipment before storage
4. Maintain a safe work environment	4.1. Use established work practices and personal protective equipment to ensure personal safety and that of others 4.2. Minimise environmental impacts of sampling and generation of waste 4.3. Dispose of all waste in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include: • collecting a variety of samples at a range of sites closely following sampling procedures • collecting samples safely with minimal environmental impact • maintaining the integrity and security of samples

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REQUIRED SKILLS AND KNOWLEDGE
• demonstrating enterprise and/or legal traceability requirements • liaising with others to access sites and conduct sampling efficiently • recognising own limitations the seeking timely advice
Required knowledge

Required knowledge includes:
• key terminology and concepts, such as sample, contamination, traceability, integrity and chain of custody
• concepts of metrology
• the international system of units (SI)
• purpose for which the samples have been collected
• the function of key sampling equipment/materials and principles of operation
• hazards, risks and enterprise safety procedures associated with routine sampling undertaken
• enterprise procedures dealing with:
  • sampling
  • waste management, clean up and spillage
  • handling, transport and storage of dangerous goods
• relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • correctly follow sampling procedures and plans when collecting samples • collect samples efficiently, safely and with minimal environmental impact • maintain the integrity and security of samples following the traceability requirements • recognise limitations and seek timely advice.
Context of and specific resources for	This unit of competency is to be assessed in the

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EVIDENCE GUIDE	
assessment	workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL972001AConduct routine site measurements*. Resources may include: • variety of sample types • sampling procedures • a selection of sampling containers, equipment and documentation.
Method of assessment	The following assessment methods are suggested: • review of sampling documentation completed by the candidate • review of the quality of samples collected by the candidate • observation of the candidate collecting a variety of samples at a range of sites • feedback from supervisors and clients that sampling plans were followed • oral/written questioning about sampling and safety procedures. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Construction materials testing** A laboratory assistant takes daily tar samples from the

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	company's retort which is used to heat tar to reduce its moisture content. The purpose of this sampling program and subsequent testing is to ensure that the water content of the hot tar is at a safe level before the tar is transferred to a road tanker and used for road construction. Serious accidents can occur during the transfer or use of tar as high water content can cause an explosion due to escape of steam. One day, the retort operator was running behind schedule and tried to convince the laboratory assistant that the water content of the tar was the same as yesterday and didn't need to be tested. The laboratory assistant was able to explain that a high water content could lead to a serious explosion and burns for the operator. **Environmental** A new field assistant was collecting samples of environmental run-off during wet weather. To successfully complete the activity, the assistant made sure that they included a sample thief, pipette, or similar to extract the sample, a container with a secure lid, and an indelible marker to write on the label. In addition, the assistant remembered to take sealable, waterproof plastic bags in which to put the containers once the samples were collected and a spare bag to protect the field notebook from rain damage. **Manufacturing** A production operator has been given the task of collecting samples of the recent batches of blended products, prior to drumming and customer delivery. In addition, the operator is required to sample the bulk raw materials stored on-site, and the drummed blend ingredients, including some powdered pigments. The operator knows that the lab needs the blend samples first and after putting on chemical gloves and safety glasses, accesses each sample point on each of the blend tanks. Because the products are under pressure in the tank manifold, it is important to guard against splashes. Some of the products are flammable hydrocarbons, so the operator ensures that static leads are connected from the tank to the sample vessel during pouring. To sample the drummed product, a sample thief is used and again, safety glasses and chemical gloves are important. The pigments present a dust hazard when being sampled, so the operator applies a protective mask over their nose and

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EVIDENCE GUIDE	
	mouth, to prevent ingestion while they use a small purpose-built shovel to empty the contents into the sample container.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards, such as:
	  • AS ISO 1000-1998 The international system of units (SI) and its application
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	  • AS/NZS ISO 9000 Set:2008 Quality management systems set
	• calibration and maintenance schedules
	• enterprise recording and reporting procedures
	• enterprise sampling procedures for specific samples, sites and clients
	• environmental legislation and regulations
	• equipment manuals
	• equipment startup, operation and shutdown procedures
	• industry codes of practice
	• maps and site plans

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RANGE STATEMENT	
	• material safety data sheets (MSDS) • material, production and product specifications • National Association of Testing Authorities (NATA) documents regarding construction materials testing • national measurement regulations and guidelines • occupational health and safety (OHS) national standards and codes of practice • quality manuals • safety procedures • standard operating procedures (SOPs)
Site hazards	Site hazards may include: • solar radiation, dust and noise • wildlife, such as snakes, spiders and domestic animals • biohazards, such as micro-organisms and agents associated with soil, air and water • chemicals, such as acids and hydrocarbons • sharps and broken glassware • manual/handling of heavy sample bags and containers • crushing, entanglement and cuts associated with moving machinery and hand tools • falling objects, uneven surfaces, heights, slopes, wet surfaces, trenches and confined spaces • vehicle handling in rough terrain and boat handling in rough or flowing water
Safety procedures	Safety procedures may include: • use of MSDS • use of personal protective equipment, such as hard hats, heavy protection, gloves, safety glasses, goggles, faceguards, coveralls, gowns, body suits, respirators and safety boots • correct labelling of hazardous materials • handling and storing hazardous material and equipment in accordance with labels, MSDS, manufacturer's instructions and enterprise procedures and regulations • regular cleaning and/or decontamination of

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RANGE STATEMENT	
	equipment • machinery guards • signage, barriers, service isolation tags, traffic control and flashing lights • lockout and tag-out procedures
Types of samples	Types of samples may include: • grab samples • disturbed or undisturbed materials • composite samples, such as time, flow proportioned and horizontal/vertical cross section • quality control samples, such as controls, background, duplicate and blanks
Materials sampled	Materials sampled may include: • gas or air samples • water, wastewater, stormwater, sewage and sludge • soils • construction materials • solid wastes, such as commercial, industrial and mining • raw materials, start, middle, end of production run samples and final products for a wide range of manufactured items, including food and beverages • hazardous materials and/or dangerous goods
Sampling tools and equipment	Sampling tools and equipment may include: • front-end loader, backhoe, excavator and drill rig • shovels, augers and bucket • sampling frames, sampling tubes, dip tubes, spears, flexible bladders and syringes • access valves • sample thief • weighted sample bottles, bottles, plastic/metal containers and disposable buckets • sterile containers, pipettes, inoculating loops and disposable spoons • pumps and stainless steel bailers

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RANGE STATEMENT	
Maintenance of integrity of samples	Maintenance of integrity of samples could include: • appropriate containers and lids (e.g. glass, plastic, amber and opaque) • sealing of sample containers • purging of sample lines and bores • decontamination of sampling tools between collection of consecutive samples • use of appropriate preservatives (e.g. sodium azide, toluene or antibiotics) • wrapping container in foil or wet newspaper • temperature control, which may involve prevention of direct contact between the sample and coolant • transfer of sterile sample into sterile container • monitoring of storage conditions • enterprise/legal traceability through appropriate sample labelling and records
Services	Services may include: • water supply, gas and electricity • telecommunications • irrigation, stormwater and drainage systems • production plant
Minimising environmental impacts	Minimising environmental impacts may involve: • replacement of soils and vegetation • driving to minimise soil erosion and damage to fauna and vegetation • disposal of surplus, spent or purged materials • recycling of non-hazardous wastes • appropriate disposal of hazardous waste • cleaning of vehicles to prevent transfer of pests and contaminants
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time

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RANGE STATEMENT	
	• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Sampling

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL943002A Participate in laboratory/field workplace safety

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to follow workplace occupational health and safety (OHS) policies and procedures, deal with the identification and control of hazards, work safely at all times, follow emergency response procedures and contribute to the maintenance of workplace safety.

Application of the Unit

Application of the unit	This unit of competency is applicable to laboratory assistants and instrument operators working in all industry sectors. OHS responses are restricted to a 'first response' approach, including the notification of appropriate enterprise personnel. Workers will be provided with clear directions, information, training and appropriate supervision. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify, control and report OHS and environmental hazards	1.1. Routinely check immediate work area for hazards prior to commencing and during work 1.2. Address hazards within area of responsibility 1.3. Report hazards and incidents to designated personnel according to enterprise policies and procedures
2. Conduct work safely	2.1. Select, fit and use appropriate personal protective clothing and equipment 2.2. Follow enterprise procedures when carrying out work tasks 2.3. Keep all work areas clean and free from obstacles 2.4. Maintain enterprise standards of personal hygiene 2.5. Safely store, transport and dispose of hazardous materials and dangerous goods

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ELEMENT	PERFORMANCE CRITERIA
3. Follow incident and emergency response procedures	3.1. Identify incident and emergency situations 3.2. Report and record incident and emergency situations according to enterprise procedures 3.3. Follow incident and emergency procedures as appropriate to the nature of emergency, using emergency equipment according to enterprise procedures
4. Contribute to OHS in the workplace	4.1. Raise OHS and environmental issues with designated personnel in accordance with enterprise procedures and legislated rights and obligations of employees 4.2. Participate in OHS activities within scope of responsibilities

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- recognising potential incidents and taking appropriate corrective action
- demonstrating workplace fire drill, incident, first aid and emergency evacuation procedures
- hazard identification and risk control, following OHS and environmental policies and procedures
- using, storing and maintaining personal protective equipment
- storing, transporting and disposing of dangerous goods following enterprise instructions and procedures
- using equipment to protect health and safety
- promptly communicating health and safety and environmental issues to designated personnel

Required knowledge

Required knowledge includes:

- roles, rights and responsibilities of self and employer
- signage, symbols and signals relating to OHS
- hazards commonly found in own job and work area and standard risk controls

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REQUIRED SKILLS AND KNOWLEDGE
• location and purpose of personal protective equipment and emergency/hazard control equipment in the work area, including first aid facilities and personnel • use, care and storage requirements for personal protective clothing and equipment used • location of advice and information on OHS issues, including material safety data sheets (MSDS) • requirements and procedures for reporting OHS hazards and incidents, including injuries, illness and near misses • the processes for raising a health and safety issue or concern • safe work practices, including handling, storage and disposal of hazardous substances and requirements for labelling of hazardous substances • work practices for use of handling equipment and any task-specific manual handling techniques as required by work role, according to enterprise procedures • standard operating procedures (SOPs) for equipment used and key safety elements of the procedures • environmental impacts and effects of interaction with hazards in the work area • enterprise procedures and instructions that govern personal work, incidents and emergencies • reporting requirements for OHS issues and potentially hazardous situations • site layout, including emergency exits, location and use of safety alarms, emergency response system, procedures and personnel • enterprise OHS and environmental policies and procedures

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • work safely • recognise potential incidents and hazards and take appropriate corrective action • follow workplace incident, first aid and emergency response procedures • promptly communicate OHS and environmental issues to designated personnel.

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EVIDENCE GUIDE	
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • other relevant technical units of competency. Resources may include: • laboratory/field work environment, equipment and materials • personal protective equipment • enterprise procedures.
Method of assessment	The following assessment methods are suggested: • observation of the candidate preparing for and undertaking a range of work tasks • written and/or oral questioning to assess underpinning knowledge and likely reactions in hazardous/emergency situations • feedback from peers and supervisors • review of candidate's responses to case studies, scenarios and/or 'what ifs'. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Manufacturing** A laboratory assistant working in a laboratory was asked to produce a particular solvent-borne paint. Because of

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EVIDENCE GUIDE	
	the hazardous nature of the task, the assistant referred to the MSDS which specified that a particular respirator and gloves be used. The assistant followed the requirements and safely prepared the batch of paint. **Food processing** One task of a laboratory assistant in a food processing company is the determination of total nitrogen in food samples by the Kjeldahl method. The assay involves digestion of the food with an aliquot of 30% hydrogen peroxide and several other reagents at more than 400°C. The assistant is familiar with the MSDS for hydrogen peroxide and uses this chemical with appropriate caution and personal protective equipment. Small spills of hydrogen peroxide sometimes occur. The assistant knows to clean these up immediately by liberally diluting the spill with water, mopping it up with a cloth and washing the hydrogen peroxide from the cloth into a sink with copious amounts of water. This attention to cleanliness is essential to minimise the risk of injury because 30% hydrogen peroxide has the appearance of water. Unlike water, it is corrosive to skin and presents a serious fire or explosion hazard if it should come into contact with many of the chemicals used in the laboratory. **Biomedical** After performing and verifying cell counts of plated samples, a technical assistant proceeded to dispose of the waste. The wastes were placed in a biohazard bag. The bag was sealed with a sterilisation indicator sticker that was clearly visible, and placed in the autoclave. The assistant checked the colour of the indicator sticker to ensure that the waste was correctly processed before disposing of the bag in accordance with SOPs.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, codes, procedures and/or enterprise requirements	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 2252 Biological safety cabinets
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	• AS/NZS 1269 Set:2005 Occupational noise management set
	• AS/NZS 1337 Eye protection
	• AS/NZS 2161 Set:2008 Occupational protective gloves set
	• AS/NZS 2210:1994 Occupational protective footwear
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	• AS/NZS 2982.1:1997 Laboratory design and construction - General requirements
	  • AS/NZS 4452:1997 The storage and handling of toxic substances
	• AS/NZS 4501 Set:2008 Occupational clothing set
	  • AS/NZS ISO 14000 Set:2005 Environmental management standards set
	• HB 9-1994 Occupational personal protection
	• Australian Dangerous Goods Code
	• Australian Quarantine and Inspection Service (AQIS) Import Guidelines
	• Australian Radiation Protection and Nuclear

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RANGE STATEMENT	
	Safety Agency (ARPANSA) Codes of Practice • gene technology regulations • Guide to physical containment levels and facility types • National Code of Practice for the labelling of workplace substances [NOHSC:2012 (1994)] • OHS national standards and codes of practice
Routine checks	Routine checks may include: • general housekeeping checks, such as obstructions which may cause trip hazards • checking of safety equipment, such as eye wash stations • checking reagents and equipment are safe to use • checking availability of emergency equipment • checking functionality of personal protective equipment
Hazards	Hazards may include: • electric shock • microbiological organisms and agents associated with soil, air, water, blood and blood products, and human or animal tissue and fluids • solar radiation, dust and noise • chemicals, such as acids, heavy metals, pesticides and hydrocarbons • aerosols from broken centrifuge tubes and pipetting • radiation, such as alpha, beta, gamma, X-ray and neutron • sharps, broken glassware and hand tools • flammable liquids • cryogenics, such as dry ice and liquid nitrogen • fluids under pressure, such as steam, hydrogen in gas liquid chromatography and acetylene in atomic absorption spectrometry • sources of ignition • high temperature ashing processes • disturbance or interruption of services • occupational overuse syndrome, slips, trips and falls

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RANGE STATEMENT	
	• manual handling, working at heights and working in confined spaces • crushing, entanglement and cuts associated with moving machinery or falling objects • pedestrian and vehicular traffic • vehicle and boat handling

Addressing hazards	Addressing hazards may include:
	• hazard and incident reporting and investigation procedures
	• elimination
	• substitution, such as review of nature of substances or processes used
	• isolation:
	  • use of appropriate equipment, such as biohazard containers, laminar flow cabinets, Class I, II and III biohazard cabinets
	  • Class PCII, PCIII, and PCIV physical containment laboratories
	• engineering
	• administrative procedures, such as:
	  • ensuring access to service shut-off points
	  • recognising and observing hazard warnings and safety signs
	  • labelling of samples, reagents, aliquoted samples and hazardous materials
	  • handling and storage of all hazardous materials and equipment in accordance with labelling, MSDS and manufacturer's instructions
	  • identifying and reporting operating problems or equipment malfunctions
	  • cleaning and decontaminating equipment and work areas regularly using recommended procedures
	  • applying containment procedures
	  • following established manual handling procedures for tasks involving manual handling
	  • use of appropriate equipment and procedures to avoid personal contamination

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RANGE STATEMENT	
	and contamination of others • following risk control measures to minimise environmental hazards • use of practices which minimise waste • reporting to appropriate personnel of abnormal emissions, discharges and airborne contaminants, such as noise, light, solids, liquids, water/waste water, gases, smoke, vapour, fumes, odour and particulates • minimising exposure to radiation, such as lasers, electromagnetic and ultraviolet • use MSDS • use of signage, barriers and service isolation tags • use of personal protective equipment, such as hard hats, hearing protection, sunscreen lotion, gloves, safety glasses, goggles, face guards, coveralls, gown, body suits, respirators and safety boots
Designated personnel	Designated personnel may include: • laboratory manager • supervisor • OHS coordinator • OHS representative
Enterprise policies and procedures	Enterprise policies and procedures may refer to: • OHS specific procedures, such as hazard and incident reporting, communication, consultation and issue resolution and risk management • controlling known hazards • minimising environmental threats • minimising and disposing of waste • responding to safety, emergency, fire and incidents • selecting/using personal protective clothing and equipment
Incidents	Incidents may include: • workplace injury and accidents • cutting, stabbing, puncturing, crushing,

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RANGE STATEMENT	
	immersion in water, suffocation, hypothermia, burns, heat stress, animal bites, allergic reactions and assaults • biological, chemical or radioactive spills, fire, bomb threat, security threat and explosion
Emergency equipment	Emergency equipment may include: • first aid equipment • eye wash kit or shower • fire extinguisher
Participating in OHS activities	Participating in OHS activities may include: • seeking assistance to clarify obligations and procedures • clarifying work instructions that impact on safety and legal liability
OHS and environmental issues which may need to be raised by employees with designated personnel	OHS and environmental issues which may need to be raised by employees with designated personnel may include: • identification of hazards not otherwise addressed • assessment of risk and decisions on measures to control risk • risk reduction measures • problems with implementation of controls • problems with recycling, by-product collection and waste disposal • investigation of injury and incidents • clarification of understanding of OHS policies and procedures
OHS and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply

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RANGE STATEMENT	
	current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Occupational health and safety

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAENV272B Participate in environmentally sustainable work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to effectively measure current resource use and carry out improvements including those reducing negative environmental impacts of work practices. This unit is based on the sustainability guideline standard GCSSUS01A Participate in environmentally sustainable work practices.

Application of the Unit

Application of the unit	This competency applies to operators/team members who are required to follow procedures so as to work in an environmentally sustainable manner. This ensures regulatory compliance and also aims at minimising environmental risks and maximises the environmental performance of the process and the organisation. It includes: • Resources used • Potential environmental hazards • Improving environmental performance (within scope of competency and authority). This competency applies to all sectors of the manufacturing industry and members of its value chain. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an

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	organisation and across different industry sectors.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify current resource use and environmental issues.	1.1. Identify workplace ***environmental and resource efficiency issues***. 1.2. Identify resources used in own work role. 1.3. ***Measure*** and record current usage of resources using ***appropriate techniques***.

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ELEMENT	PERFORMANCE CRITERIA
	1.4. Identify and report workplace environmental hazards to appropriate personnel.
2. Comply with environmental regulations.	2.1. Follow ***procedures*** to ensure ***compliance***. 2.2. Report environmental **incidents** to appropriate personnel.
3. Seek opportunities to improve environmental practices and resource efficiency.	3.1. Follow ***enterprise plans*** to improve environmental practices and resource efficiency. 3.2. Make ***suggestions*** for improvements to workplace practices in own work area.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include the ability to:

- report as required by procedures
- follow procedures and instructions and respond to change
- ask questions and seek clarifications relating to work requirements

Reading and writing is required in order to interpretrequired procedures and complete required workplace forms/reports.

Numeracy is required to interpret numeric workplace information, readings and measurements, handle data as required and complete numeric components of workplace forms/reports.

Required knowledge

Competency includes sufficient knowledge to:

- have a basic understanding of sustainability
- know the environmental hazards/risks, resource use and inefficiencies associated with own workplace (at an appropriate level)
- know the relevant environmental and resource efficiency systems and procedures for own work area
- know the impact of laws and regulations to a level relevant to the work context

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to follow workplace procedures according to instructions given and to participate in the improvement of environmental and resource efficient work practices at own level of responsibility. Evidence must be strictly relevant to the particular workplace role.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to: • identify and measure resources used in their job • identify situations likely to lead to an environmental incident • follow procedures related to environmental performance. Consistent performance should be demonstrated. For example, look to see that: • work is routinely to procedures • the minimum of resources is used consistent with the job requirements, good practice and the procedures.
Context of and specific resources for assessment	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Depending on the selected methods of assessment access may be required to: • workplace procedures and plans • documentation in relation to production, waste, overheads, hazard control/management • reports from supervisors/managers • case study/scenarios
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace

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EVIDENCE GUIDE	
	• using targeted questioning for appropriate portions • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures including all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.
Environmental and resource efficiency issues	Environmental and resource efficiency issues include minimisation of environmental risks and maximisation of opportunities to improve business environmental performance and to promote more efficient production and consumption of natural resources, for example by: • minimisation of waste, through implementation of the waste management hierarchy

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RANGE STATEMENT	
	• efficient and effective use of energy and other resources • seeking alternative sources of energy • efficient use of materials and appropriate disposal of waste • use of controls to minimise the risk of environmental damage from hazardous substances • efficient water use • reducing emissions • life cycle analysis applied to issues such as energy supply, materials, transport, production
Measure	Measure should be interpreted in a manner consistent with the scope of the job and may include things like: • counting the number of items entering/leaving a work area • reading indicators in the work area • obtaining relevant information from support personnel • other simple means
Appropriate techniques	Appropriate techniques include: • material fed to/consumed by plant/equipment • plant meters and gauges • job cards including kanbans • examination of invoices from suppliers • measurements made under different conditions • examination of relevant information and data.
Compliance	Compliance includes meeting relevant federal, state and local government laws, by-laws, regulations and mandated codes of practice. It also includes any codes and standards that the enterprise applies voluntarily.
Incidents	Incidents include: • breaches or potential breaches of regulations • occurrences outside of standard procedure which may lead to lower environmental performance.
Enterprise plans	Enterprise plans include:

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RANGE STATEMENT	
	• documented policies and procedures • work plans to minimise waste, increase efficiency of water/energy use, minimise environmental hazards
Suggestions	Suggestions include ideas that help to: • prevent and minimise environmental risks and maximise opportunities • reduce emissions of greenhouse gases • reduce use of non-renewable resources • improve energy efficiency • increase use of renewable, recyclable, reusable and recoverable resources • reduce waste • increasing the reusability/recyclability of wastes/products • reduce water usage and/or water wastage.

Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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MSACMT481A Undertake proactive maintenance analyses

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the skills needed for the most common forms of analyses associated with predictive maintenance strategies.

Application of the Unit

Application of the unit	In a typical scenario, a technical expert (usually an engineer, technician or tradesperson) will be required to undertake analyses for the purpose of predictive/preventative/reliability centred maintenance as part of a ***competitive manufacturing*** strategy. This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, and planning and organising in order to undertake maintenance analyses. This is normally done in the context of using computer technology, and requires aspects of learning and self management to ensure team involvement and facilitation of learning.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Liaise with operator	1.1. Establish a relationship with the operator/s of equipment/plant 1.2. Ensure the operator has the required skills and resources to keep the equipment/plant clean 1.3. Ensure the operator is able to effectively monitor the operation of the equipment/plant 1.4. Regularly communicate with operator about the ***Overall Equipment Efficiency*** (***OEE***) of their equipment/plant 1.5. Involve operator, team leader and other key personnel in identification of skill needs and means of skill acquisition to fill any identified gaps
2. Analyse history	2.1. Analyse ***Mean Time Between Failures*** (***MTBF***) (or similar statistical history analysis)from maintenance records 2.2. Analyse performance data of the equipment/plant 2.3. Identify causes of changes to historic trends/status 2.4. Determine methods of ensuring causes of improvements are locked in and deterioration resolved

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ELEMENT	PERFORMANCE CRITERIA
3. Undertake Failure Mode Effects Analysis (FMEA) (or similar)	3.1. Undertake analysis 3.2. Record results of analysis 3.3. Investigate methods of eliminating possibility of failure and/or minimising the impact of the failure 3.4. Liaise with operator, team leader and other key personnel regarding possible solutions 3.5. Select most appropriate solution 3.6. Implement selected solutions
4. Undertake condition monitoring analysis	4.1. Obtain data for condition monitoring analysis 4.2. Interpret condition monitoring data 4.3. Predict required maintenance type and timing from condition monitoring data 4.4. Liaise with operator, team leader and other key personnel regarding implications of condition monitoring report 4.5. Involve team members in development of changes to maintenance strategy to ensure awareness, learning and commitment

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills:

- communication
- teamwork
- analysis
- problem solving
- mathematics
- planning
- reading and interpreting engineering specifications/drawings
- computer use
- prioritising
- recording data.

Required knowledge:

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REQUIRED SKILLS AND KNOWLEDGE
• cleaning needs, techniques and principles • methods of assessing skill gaps and filling them • techniques for determining MTBF or similar • techniques for undertaking FMEA or similar • underpinning principles of competitive manufacturing strategies being implemented and how to adapt them to maintenance • root cause analysis • condition monitoring.

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to undertake a range of predictive maintenance analyses as well as support operations staff, and implement an advanced maintenance strategy.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence should be available as to the analyses undertaken and the support provided.
In what context should assessment occur?	Assessment needs to occur in an organisation using predictive maintenance strategies or a simulation in a workshop or by case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other relevant maintenance units. This unit is related to: • *MSACMT280A Undertake root cause analysis* • *MSACMT281A Contribute to the application of a proactive maintenance strategy*, and • *MSACMT681A Develop a proactive maintenance strategy* which cover different aspects/levels of this area.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined

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EVIDENCE GUIDE	
	by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Generally evidence will be required from a range of predictive maintenance analyses in order to have sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation using predictive maintenance procedures.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing

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RANGE STATEMENT	
	• preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP etc. • statistical process control systems including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Overall Equipment Efficiency (**OEE**	Overall Equipment Efficiency (OEE) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start up waste.
Mean Time Between Failure (**MTBF**)	Mean Time Between Failure (MTBF) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing. There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the

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RANGE STATEMENT	
	problem.
Failure Mode and Effects Analysis (**FMEA**)	Failure Mode and Effects Analysis (FMEA) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique (such as ***HAZOP***) for design and modification. ***Hazard and Operability Studies*** (***HAZOP***) is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability.
Condition monitoring	In this unit condition monitoring is used to describe the process of analysing the implications of condition monitoring data for proactive maintenance whether it be obtained from non destructive testing reports, visual assessment by experts, diagnostic reports obtained from SCADA or other enterprise or equipment software and product or process quality analyses. It does not require the actual undertaking of the NDT or condition monitoring assessment or test. If this is required appropriate units from other Training Packages will be required.

Unit Sector(s)

Unit Sector	CM Tools

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corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT461A Facilitate SCADA systems in a manufacturing team or work area

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a person who is required to use System Control and Data Acquisition (SCADA), or other similar systems, and support the team in their use of SCADA.

Application of the Unit

Application of the unit	In a typical scenario, an organisation will be using SCADA. The person will access the SCADA system for their own work, but will also need to provide support and organise skill development programs for their team members. This competency is also relevant to maintenance personnel using a SCADA system to coordinate maintenance activities. This unit primarily requires the application of skills associated with using communication technology and supporting team use of SCADA systems. Problem solving, initiative and enterprise, and planning and organisational skills are required to ensure that system is used efficiently. This requires aspects of learning and self management to ensure own performance and that of the team.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	*MSACMT261A*	*Use SCADA systems in manufacturing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Communicate using the SCADA system	1.1. Send and receive information using SCADA 1.2. Send and receive messages using SCADA
2. Make decisions using SCADA	2.1. Interrogate the SCADA system to find required current, historical or predicted information 2.2. Take actions appropriate to the information
3. Monitor the use of SCADA	3.1. Routinely monitor SCADA information and use along the ***value chain*** 3.2. Identify poor uses of SCADA system within team and system inadequacies 3.3. Identify team members who require additional support 3.4. Take appropriate action to provide required support 3.5. Take appropriate action to improve SCADA system and its use

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ELEMENT	PERFORMANCE CRITERIA
4. Support team use SCADA	4.1. Regularly communicate with team, both using SCADA based communication and face to face 4.2. Identify system improvements required 4.3. Identify skill improvement needs 4.4. Take appropriate actions to have the identified improvements implemented

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• keyboarding/mousing • communication • teamwork • problem solving. • planning and organising
Required knowledge:
• hierarchy of SCADA system and operation • information available from and controls exercised by/through the SCADA system • facilities and information offered by SCADA • support/training/skill development mechanisms available for access by team member.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	The person will not only be a competent user of SCADA but will also support their team using it.

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EVIDENCE GUIDE	
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of competent use of SCADA and also of assisting the team to use it effectively and efficiently.
In what context should assessment occur?	Assessment will need to occur on an organisation using SCADA or by use of SCADA simulation.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other relevant units. This unit covers the intermediate skill level of SCADA. *MSACMT261A Use SCADA systems in manufacturing*, and *MSACMT660A Develop the application of enterprise systems in manufacturing* cover the lower and higher skill levels in CM respectively. *MSACMT261A Use SCADA systems in manufacturing* is specified as a prerequisite, and should be applied to the person's own job.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence of routine use over an extended period should be available. SCADA systems will typically log all interactions with it. Interrogation of the SCADA system will therefore provide evidence of the operator's use of it. Actions taken may also be

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EVIDENCE GUIDE	
	accessible from the SCADA system itself, or may need other evidence available from the process.
What are the specific resource requirements for this unit?	Access to an organisation using SCADA.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
SCADA	System Control and Data Acquisition (SCADA) is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action. In the continuous manufacturing sector, the SCADA system is sometimes integrated into other sophisticated computer control systems such as Distributed Control System (DCS) and indeed these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system).
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.

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Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT460A Facilitate the use of planning software systems in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a team leader or technical expert to use and facilitate the use of planning software systems (known by various names such as ERP, SAP and MRP). This unit also covers the interactions of the person with a planning software system as they both use it for their own work and support their team members use it.

Application of the Unit

Application of the unit	In a typical scenario, an organisation will be using planning software. The person will access the planning software system for their own work, but will also need to provide support and organise skill development programs for their team members. The planning software system will be a routine part of their work life. This unit primarily requires the application of skills associated with using communication technology and supporting team use of planning software. Problem solving, initiative and enterprise, and planning and organisational skills are required to ensure that planning software is used efficiently. This requires aspects of learning and self management to ensure own performance and that of the team.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	*MSACMT260A*	*Use planning software systems in manufacturing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Communicate using the planning software system	1.1. Send and receive information using planning software 1.2. Send and receive messages using planning software
2. Make decisions using planning software	2.1. Interrogate the planning software system to find required current, historical or predicted information 2.2. Take actions appropriate to the information in accordance with procedures
3. Monitor the use of planning software	3.1. Routinely monitor planning software information and use along the ***value chain*** 3.2. Review performance and use of planning software with team
4. Support team use planning software	4.1. Regularly communicate with team, both using planning software and face to face 4.2. Identify improvements required

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ELEMENT	PERFORMANCE CRITERIA
	4.3. Take appropriate actions to implement improvements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• keyboarding/mousing • communication • teamwork • problem solving. • planning and organising
Required knowledge:
• hierarchy of planning software system and operation • information available from/through the planning software system • facilities and information offered by planning software • support/training/skill development mechanisms available for access by team members.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will need to be able to demonstrate an ability to understand and apply planning software to a work location or area and send, receive and interpret process and production data for that area. They should also be able to assist others in the use of the planning software system. Software editing is not required for this unit but the ability to recognise and suggest application improvements is required

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EVIDENCE GUIDE	
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of competent use of planning software and also of assisting their team to use it effectively and efficiently.
In what context should assessment occur?	Assessment will need to occur on an organisation using planning software or simulation software.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other relevant units. This unit covers the intermediate skill levels in CM for planning software. *MSACMT260A Use planning software systems in manufacturing* and *MSACMT660A Develop the application of enterprise systems in manufacturing* cover the lowest and highest skill levels respectively. *MSACMT260A Use planning software systems in manufacturing* is specified as a prerequisite, and should be applied to the person's own job.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence of routine use over an extended period should be available. Planning software systems will typically log all interactions with it. Interrogation of the planning software system will therefore provide evidence of the operator's use of it. Actions taken

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EVIDENCE GUIDE	
	may also be accessible from the planning software system itself, or may need other evidence available from the process.
What are the specific resource requirements for this unit?	Access to an organisation using planning software.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Planning software	Planning software is a general term applied to a number of software systems which integrate a range of business information such as finance, logistics maintenance and production. It is frequently referred to by names such as ERP, SAP or MRP/MRPII. In some cases it can be integrated with engineering applications such as Systems Control and Data Acquisition (SCADA) systems. In such cases *MSACMT261A Use SCADA systems in manufacturing* may also be required. Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes

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RANGE STATEMENT	
	called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning .

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT453A Use six sigma techniques

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to apply six sigma techniques in the workplace. Six sigma is a statistical based technique for improving quality in manufacturing and other supporting processes.

Application of the Unit

Application of the unit	This unit applies where a statistical based strategy such as six sigma will be used to establish current quality performance and then to investigate and improve all or part of a process. This will be done with other members of the process team. This unit requires the application of skills associated with using information, problem solving, initiative, enterprise, planning and organising in order to identify an area requiring improvement and develop a measured process to make improvements. This unit has prerequisites of *MSACMT452A Apply statistics to processes in manufacturing* Depending on the scale of six sigma implementation in the enterprise the following units may also be relevant: • *MSACMT450A Undertake process capability improvements* • *MSACMS401A Ensure process improvements are sustained* • *MSACMC410A Lead change in a manufacturing environment* • *MSAPMSUP390A Use structured problem solving tools*

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT452A*	*Apply statistics to processes in manufacturing*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify an area requiring improvement	1.1. Identify customer needs from process 1.2. Identify customer benefits delivered by process 1.3. Identify areas requiring improvement
2. Apply DMAIC process	2.1. Define improvement project 2.2. Acquire required measurements/data 2.3. Analyse data and determine possible process improvements 2.4. Develop and test improvement solutions 2.5. Control and standardise the improvement
3. Review and confirm improvement.	3.1. Determine and document benefits 3.2. Ensure procedures and other relevant

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ELEMENT	PERFORMANCE CRITERIA
	documentation is updated for improved procedure 3.3. Review process data after an appropriate period and confirm the improvement

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• analysis • problem solving • communication • documenting • calculations • use of statistics
Required knowledge:
• Charting such as Pareto Charts, fish bone diagrams • Statistical principles • Acceptance criteria/confidence levels • Define, Measure, Analyse, Improve and Control (DMAIC) methods • Six sigma principles.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package.	
Overview of assessment requirements	Assessment should confirm the ability to apply simple six sigma techniques in a manufacturing environment.

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EVIDENCE GUIDE	
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of applying all of the DMAIC stages to a manufacturing improvement project simple six sigma undertaken should be available.
In what context should assessment occur?	Assessment will need to occur in an organisation implementing six sigma or by project. The project should be clearly defined. Work on the project can be undertaken as part of a team. However the individual skills and knowledge of the person undertaking the unit must be able to be separately assessed.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units dealing with six sigma type work and/or change management. Depending on the project and the nature of the manufacturing operation the following units may be able to be assessed with this unit: • *MSACMT450A Undertake process capability improvements* • *MSACMS401A Ensure process improvements are sustained* • *MSACMC410 Lead change in a manufacturing environment* • *MSAPM290A Use structured problem solving tools*
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the

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EVIDENCE GUIDE	
	workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Generally a number of small six sigma projects undertaken or active involvement in some larger six sigma projects would be required to generate sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation using six sigma.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
DMAIC	DMAIC is a structured improvement process involving the following stages: • define • measure • analyse • improve • control and standardise
Define	Definition of the project to include: • 'as is' process map • defining benefits from the project • problem statement • goal statement • project scope
Measurements	Measurements may include: • identification of key measures/attributes

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RANGE STATEMENT	
	• sampling schedule for project
Analyse	Analyse may include: • statistical analysis of data • root cause analysis • use of various problem solving/analysis tools
Improvement	Improvement may include: • generation and testing of improvements • selection of appropriate improvements
Control and standardise	Control and standardise may include: • documenting • transferring ownership of improved process

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT452A Apply statistics to processes in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to apply statistical theory and principles to the analysis and control of processes in manufacturing.

Application of the Unit

Application of the unit	In a typical scenario, statistical process control is being used on a process in a manufacturing organisation. Usually this will be to monitor the process and determine when action needs to be taken. The appropriate action will then be taken in accordance with standard procedures. To do this the person will apply their knowledge of frequency distribution and variation to the data/chart to distinguish between random and non-random variation and their understanding of the process and/or equipment to help interpret those results. This unit primarily requires the application of skills associated with gathering and analysing data and communicating statistical information to others. This unit also has a strong emphasis on problem solving, initiative and enterprise, planning and organising, and self management to solve problems and manage processes.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Collect process data.	1.1. Interpret sampling scheme 1.2. Obtain measurements in accordance with standard procedures 1.3. Handle data as required.
2. Interpret data	2.1. Plot data on appropriate control chart 2.2. Distinguish between random and non-random patterns of results 2.3. Identify results outside the control limits 2.4. Recognise situations requiring action 2.5. Take appropriate action in accordance with standard procedures 2.6. Determine cost of non-conformance
3. Calculate control limits.	3.1. Consult relevant stakeholders to determine appropriate limits 3.2. Use relevant methods to calculate/revise control limits

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Plot limits on control chart 3.4. Explain impact of limit to relevant stakeholders

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• analysis • problem solving • communication • documenting • calculations • use of statistics
Required knowledge:
• sampling techniques • purpose of sampling and measurement • random, systematic, stratified sampling • relevance, reliability and representativeness of samples/data collected • purpose of replication of data for statistical control • samples, populations, finite and infinite populations and the differences • methods of calculating means, standard deviations and the like and their purpose in statistical control • the causes of variation in a process • the meaning of broad/ narrow frequency distributions/ range/standard deviations and skewed distributions in process terms • types of control charts and their applications to different types of process/product and for different purposes • process causes of variation and typical cause types of non-random variation • non-process (eg measurement) causes of variation • recognition of stable and unstable processes • causes of stability/instability in the process • calculation of control limits/process capability and the applications of different control limits • the standard distribution curve and confidence limits.

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package	
Overview of assessment requirements	The competent person will be able to apply statistical theory to a process to interpret and reduce its variation.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of the application of statistical theory to a process should be available
In what context should assessment occur?	Assessment will need to occur in an organisation implementing statistical process control or by project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units dealing with process capability and/or change management.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Generally the application of statistics over a period of time would be required to generate sufficient evidence
What are the specific resource requirements for this unit?	Access to an organisation using statistical control.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Sampling scheme	Sampling scheme may include: • sampling for attributes or sampling for variables • batch, continuous or custom made products • number of items/samples • size of sample • timing of sampling • location of sampling points • type of sample • number/type of measurements to be done on each sample • sampling equipment • measurement/testing equipment/methods
Procedures	Procedures includes all work instructions, standard operating procedures, formulas/ recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, ' procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

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RANGE STATEMENT	
Handle data	Handle data may include: • calculating means, ranges, mean of means, standard deviation (using appropriate calculation aids) • entering data into a software package • recording data either in writing or electronically • other required manipulations of the data.
Control chart	Control charts may include: • run • tally • mean/range • attributes • other relevant charts
Random	Random variation is the term used in statistical control to refer to those variations for which no cause can be found.
Non-random	Non-random, also called identifiable cause, or assignable cause or special cause are those variations for which a cause can be found and so the cause of the variation eliminated. Non-random variation may also be used to predict possible breaches of the control limits.
Control limits	Control limits, also referred to as process capability are those limits within which the process will operate if it is 'under control'.
Cost of non-conformance	Cost of non-conformance includes: • reprocessing/rework • expediting • unplanned service • excess inventory • complaint handline • downtime • returns • scrap • labour costs • material costs • infrastructure costs/overhead • utility costs
Appropriate limits	Appropriate limits may include:

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RANGE STATEMENT	
	• 1 sigma warning limits • 2 sigma warning limits • 3 sigma control limits • 6 sigma limits

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT451A Mistake proof a production process

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to make changes which prevent errors and/or backsliding to a pre-improvement level of practice. In the CM environment, this unit would typically be done by a team leader, technical expert of similar person.

Application of the Unit

Application of the unit	In a typical scenario a person needs to analyse the process that a team is responsible for and determine methods of ***mistake proofing*** it (i.e. ensuring it only produces product within an, acceptable range). After improvement activities have been undertaken these improvements need to be sustained. This unit requires the application of skills associated information gathering and analysis. Initiative, enterprise and problem solving are also required to identify mistakes and determine strategies for elimating them. This unit also requires communication and team building skills to ensure mistake proofing strategies are implemented, and self management and learning skills to continually reflect on and integrate feedback about the effectiveness of strategies.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse process	1.1. Identify sources of variability/non-conformance in the process 1.2. Identify critical control points in process 1.3. Analyse causes of variability/non-conformance
2. Develop preventative techniques/systems	2.1. Liaise with team members and other people to develop mistake proof method of performing operation 2.2. Test and validate mistake proofing
3. Implement permanent fix	3.1. Liaise with relevant people to have systems/procedures changed to implement solution 3.2. Liaise with relevant people to implement the solution 3.3. Liaise with relevant people to ensure the workforce has an appropriate skills set 3.4. Follow through to ensure implementation occurs

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ELEMENT	PERFORMANCE CRITERIA
4. Monitor implementation	4.1. Critically observe the implementation 4.2. Compare the results of the implementation against the expected outcomes 4.3. Modify solution to improve outcomes 4.4. Ensure procedures reflect change 4.5. Ensure training/assessment reflects change 4.6. Audit change at agreed period/cycle 4.7. Take action on any observed deviation
5. Seek improvements	5.1. Observe changes 5.2. Analyse process again if required to ensure improvements are sustained

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication ability to discuss items with both operators and technical support personnel • problem solving • analysis • team work • design conceptualisation.
Required knowledge:
• understanding of their process • factors in the process which may cause variability • methods of controlling the variability in the process • mistake proofing methods relevant to the process/product.

Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in

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EVIDENCE GUIDE conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to analyse their process and implement systems to ensure the process is mistake proof and the operators, work in a predictable way with little or no chance of mistake.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of actions taken to mistake proof the process should be available.
In what context should assessment occur?	Assessment needs to occur in a workplace implementing competitive manufacturing or by using a suitable project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be used as a stand alone unit or it may be assessed concurrently with any of: • *MSACMT250A Monitor process capability* • *MSACMT450A Undertake process capability improvements* • *MSACMT650A Determine and improve process capability*.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for	Where evidence is from the application of *baka-yoke* to

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EVIDENCE GUIDE	
demonstration of consistent performance?	continuous improvement, then there should be evidence that it is practiced routinely and from a number of standardisation activities. Where the evidence is from an initial standardisation of a process, or a single, large and complex standardisation/change process the may provide sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation using a competitive manufacturing approach.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Mistake proofing	Sometimes known as baka-yoke/poka-yoke, a manufacturing technique of preventing mistakes by designing the manufacturing process, equipment, tools and components/subassemblies etc so that an operation literally cannot be performed incorrectly. An attempt to perform incorrectly, as well as being prevented, is usually met with a warning signal of some sort.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the operation of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

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Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT450A Undertake process capability improvements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a team leader/technical expert to analyse data from the process, develop improvements to eliminate variation due to assignable causes and then implement actions.

Application of the Unit

Application of the unit	In a typical scenario, a person reviews a range of process capability data and information, makes some changes/arranges for changes to be made to ***procedures***, equipment or process and then recalculates the process capability. Process capability may have been determined using either a ***six sigma*** (***6***?) or ***three sigma*** (***3***?) process. This unit primarily requires the application of skills associated with communication, information gathering and analysis. Initiative, enterprise and problem solving are also required to identify opportunities to improve process capacity. This unit also requires aspects of self management and learning to validate own analysis.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	*MSACMT452A*	*Apply statistics to processes in manufacturing*

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Obtain required data	1.1. Identify process for study 1.2. Obtain/organise to obtain required data/information
2. Analyse information	2.1. Analyse past data and determine assignable causes 2.2. Develop possible improvements to eliminate assignable causes 2.3. Incorporate own experience and learning into proposed process improvements
3. Improve process capability	3.1. Liaise with relevant people to implement improvements 3.2. Obtain required authorities to implement improvements 3.3. Obtain/organise to obtain required data for improved process 3.4. Recalculate process capability 3.5. Implement revised data collection/processing and new capability information

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• mathematical • statistical methods • communication • negotiation • planning • analysis • problem solving • teamwork • computer operation.
Required knowledge:
• data collection methods • data processing techniques required • variability and normal distribution • three sigma or six sigma processes as relevant • random and non-random results - recognition of assignable causes • causes of different types of non-random results • causes of random variation • process understanding sufficient to translate the data into variations in the process and determine methods of controlling them.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	The person should be able to analyse a process and recalculate process capability/trial limits after changes have been made.
What critical aspects of evidence are required to demonstrate	Evidence should be available of the analysis of process information and the recalculation of process

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EVIDENCE GUIDE	
competency in this unit?	capability/trial limits. The improvements made may be as a result of continuous improvement with the process capability being recalculated periodically, or the improvement may be as a result of an improvement project with the process capability recalculated as part of that project.
In what context should assessment occur?	Assessment may occur in an organisation which uses process capability to monitor its process and as a tool for improving its process or may occur using a specific project/projects to improve process capability.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with a continuous improvement unit. This unit is related to: • *MSACMT250A Monitor process capability*, and • *MSACMT650A Determine and improve process capability* which apply to the lower and higher skill levels in CM respectively. It may also be appropriate to relate this unit to *MEM15008B Perform advanced statistical quality control* where the person is required to perform statistical manipulations (i.e. where these are not done automatically for the operator e.g. by a computer system).
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and

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EVIDENCE GUIDE	
	agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	This should normally be a routine part of the team leader's job. Where improvements result from a continuous improvement/kaizen process, then a few rounds of improvement and capability recalculation should be required as evidence of competence. Where the improvements results from an improvement project, and this is a complex project and includes the recalculation and implementation of the revised process capability, then one project may be provide sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation using process capability to control and improve its process.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Six sigma (**6s**)	Six sigma is a statistical tool for recording defects and determining capability. Six sigma limits equate to 3.4 defects per million opportunities for each product or service transaction. Six sigma is also used as a general term covering a competitive manufacturing approach. Six sigma training typically covers several units of competency in this Training Package.
Three sigma (**3s**)	Traditional statistical process control uses three sigma limits which equates to 3 defects per thousand opportunities for each product or service transaction.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be

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RANGE STATEMENT	
	written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT441A Facilitate continuous improvement in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to facilitate continuous improvement (kaizen) in an organisation.

Application of the Unit

Application of the unit	In a typical scenario, this unit would apply to a team leader with responsibility for facilitating ongoing continuous improvement of the manufacturing process within the scope of their team's area of responsibility. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning and organising in order to develop a continuous improvement process. This unit has a strong emphasis on developing and resourcing a team to embrace continuous improvement strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Facilitate improvement team.	1.1. Assist the improvement team consider and select appropriate improvement projects 1.2. Facilitate resources and arrangements for the team to undertake improvement projects 1.3. Arrange for the provision of required data 1.4. Assist the improvement team develop ***scope and benefit statements*** 1.5. Organise for ongoing training of improvement team members as required
2. Build a continuous improvement process.	2.1. Organise for training as required for work group members 2.2. Encourage work group members to routinely monitor ***key process indicators*** 2.3. Build capacity in the work group to critically review the relevant parts of the value chain 2.4. Assist work group members to formalise improvement suggestions 2.5. Facilitate relevant resources and assist work group members to develop implementation plans 2.6. Monitor implementation of improvement plans taking appropriate actions to assist implementation where required.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• analysis • problem solving • planning and organising • communication • negotiation • documenting
Required knowledge:
• continuous improvement process.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package	
Overview of assessment requirements	Assessment should confirm the ability to facilitate the use of continuous improvement at a team level within a manufacturing organisation
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of the facilitation of continuous improvement should be available
In what context should assessment occur?	Assessment will need to occur in an organisation using continuous improvement or by project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units.

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EVIDENCE GUIDE	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment
What evidence is required for demonstration of consistent performance?	Generally routine continuous improvement by the work group and improvement team(s) from the work group would be needed to generate sufficient evidence
What are the specific resource requirements for this unit?	Access to an organisation using continuous improvement.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Scope and benefit	Scope and benefit statements of improvement project

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RANGE STATEMENT	
statements	may include: • description of the business • the target work process • what the key stakeholders seek from the improvement project • a mission for the event • a set of goals • a statement of the do's and don'ts for the improvement project.
Key process indicators	Key process indicators may include: • statistical process control data/charts • orders • lost time, injury and other OHS records • equipment reliability charts • etc.

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT440A Lead 5S in a manufacturing environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the competencies needed to facilitate and improve the 5S housekeeping environment.

Application of the Unit

Application of the unit	In a typical scenario, an organisation is implementing or practising a 5S approach to housekeeping. While 5S places much of the responsibility on team members, team leaders needs to support, encourage and facilitate effective 5S in the workplace. The manufacturing environment for 5S may include the warehouse, tool shops, office etc. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning, organising and self management in order to provide leadership in a 5S environment. This unit has a strong emphasis on planning and change management, but also requires an ability to learn from experience and feed new information back into strategies to improve performance.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Facilitate the set up of 5S	1.1. Assist team members to determine what are necessary and unnecessary items in the work area 1.2. Assist team members to determine optimum assigned location for all necessary items 1.3. Liaise with relevant production and occupational health and safety (OHS) personnel in determining optimum locations 1.4. Assist team members to determine optimum location for unnecessary items 1.5. Assist team members to determine 5S schedule 1.6. Ensure ***procedures*** reflect 5S practices 1.7. Assist team members to achieve the required level of skill
2. Monitor 5S	2.1. Check work area for 5S implementation as part of normal routine 2.2. Identify non-conformances 2.3. Negotiate solutions to non-conformances

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ELEMENT	PERFORMANCE CRITERIA
3. Improve the 5S	3.1. Work with team members to find areas for improvement 3.2. Assist team members to develop improvement solutions 3.3. Facilitate the availability of resources required for the improvement solution 3.4. Facilitate the implementation of the improvement solution

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills:

- communication
- planning
- organising
- prioritising
- reading and interpretation
- recording
- problem solving
- teamwork.

Required knowledge:

- meaning and application of 5S to their job
- principles of efficient workplace organisation
- purposes of 5S
- procedures relevant to job
- identification of skill gaps
- methods of addressing skill gaps
- ways of encouraging team members to find and suggest areas for improvement
- methods of making/recommending improvements
- methods of accessing required resources
- OHS

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment requirements	There should be evidence of successful application of 5S in the person's work group and their positive interaction with it.
What critical aspects of evidence are required to demonstrate competency in this unit?	There should be evidence of the person's assisting team members to implement 5S and/or to implement improvements to 5S. There should be evidence of continuous improvement.
In what context should assessment occur?	Assessment needs to occur in a workplace practising or implementing 5S.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units relating to the team leader's interactions with their team. This unit differs from *MSACMT240A Apply 5S procedures in a manufacturing environment* which covers the application of 5S to the person's own work.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement

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EVIDENCE GUIDE	
	of the assessment.
What evidence is required for demonstration of consistent performance?	5S needs to be a routine, natural part of everyone's job. As such there should be evidence of consistent application of 5S over an extended period.
What are the specific resource requirements for this unit?	Access to a workplace implementing or practising 5S. No other specific resources are required.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
5S	5S is a system of work organisation originally developed in Japan based around: A close translation of the five stages in the housekeeping approach is: • sort • set in order • shine • standardise • sustain

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Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT430A Improve cost factors in work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to evaluate the product or process outcomes of a team in terms of their cost components and to be able to determine in general terms the cost impacts of alternative actions.

Application of the Unit

Application of the unit	In a typical scenario, a person is able to assess the relative costs of alternatives and use this as one of the key factors in decision making. Typical decisions include the efficient organisation of work within a team and the improvement of throughput and cycle times. Decisions are made within the scope of the team's authority and according to procedures This unit primarily requires the application of skills associated with communication and information gathering, teamwork and problem solving to analyse the cost components of team processes. Initiative, enterprise, planning and organising are also required identify opportunities for improved cost efficiency. This unit also requires a degree of self management and learning to effectively operate and maintain skills and performance.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Analyse cost components of team's function	1.1. Identify ***cost components*** in the product or ***process***
	1.2. Identify costs factors under control of the team
	1.3. Identify causes of variability in costs
	1.4. Analyse impact of costs on production or process activities undertaken by team
2. Improve cost efficiency of team processes	2.1. Identify methods of improving productivity and/or reducing costs within team's area of responsibility
	2.2. Determine cost/ ***benefit*** ratio of alternative methods improving productivity and/or reducing costs
	2.3. Consult with all relevant stakeholders regarding possible changes
	2.4. Recommend changes which will increase productivity and reduce cost and variability
	2.5. Implement recommended changes in

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ELEMENT	PERFORMANCE CRITERIA
	consultation with relevant stakeholders

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• basic numeracy.
Required knowledge:
• cost components of products made • costs concepts such as expense, income and cost benefit • major cost contributors to product (e.g. energy) • the difference between internally and externally controlled costs • difference between overhead, labour and consumables.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will as part of their routine decision making aim to maximise the cost efficiency of their work team within their scope of authority. There should be evidence of their doing so.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of routinely analysing cost factors relevant to their team's operation and implementing improvements to the team's cost efficiency.
In what context should assessment occur?	Assessment will need to occur in a workplace or by use of a work based case study.
Are there any other units which could or should be assessed with this	This unit may be assessed concurrently with appropriate units on continuous improvement.

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EVIDENCE GUIDE	
unit or which relate directly to this unit?	
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be available over a period of time or from more than one process or product.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies. No other specific resources are required.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Cost components	Cost components may include fixed and variable costs such as power/energy, materials, plant and equipment, salary and wages, office expenses such as telephone, and government taxes and charges.
Process	Process may include a production, maintenance, logistics or office process in a manufacturing environment.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
Benefits	Benefits should include positive benefits as well as negative benefits such as quality, safety, reliability and similar issues which may be impacted by a cost saving.

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT423A Monitor a manufacturing levelled pull system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to monitor the operation of a pull system in a competitive manufacturing environment and recommend improvements.

Application of the Unit

Application of the unit	This unit covers the skills needed by a team leader working in a manufacturing enterprise using a pull manufacturing system. The unit covers the skills needed to monitor daily working of the system, identify problems and take appropriate action on problems. The manufacturing system may be a total pull system or it may be a mixed push/pull system. If additional problem solving skills are required then the following units should be selected: This unit primarily requires the application of skills associated with using information and problem solving skills to monitor pull system and analyse discrepancies. It also requires skill in initiative and enterprise, and planning and organising to determine and act on opportunities for improvement. Aspects of self management and learning are required to ensure own ability to improve systems.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	*MSACMT280A*	*Undertake root cause analysis*

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Monitor the pull system.	1.1. Identify the ***pacemaker*** process 1.2. Identify rate of production set by the pull system 1.3. Determine actual rate of production at key parts of the process 1.4. Identify ***types of inventories*** within process 1.5. Compare actual inventories with planned inventories 1.6. Note discrepancies between actual and planned rates and inventories
2. Take corrective action.	2.1. ***Determine cause***(s) of discrepancies 2.2. Determining ***action required*** to rectify causes of discrepancies 2.3. Take appropriate action in conjunction with relevant ***stakeholders***
3. Test/improve the pull	3.1. Identify recurrent discrepancies

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ELEMENT	PERFORMANCE CRITERIA
system.	3.2. Determine cause(s) of discrepancies 3.3. Determine action required to rectify cause 3.4. Identify unnecessary levels of inventories 3.5. Discuss impacts of reduced inventories with relevant stakeholders 3.6. Take/initiate appropriate action to rectify recurrent discrepancies/reduce levels of unnecessary inventory 3.7. Monitor the system to determine the effects of the change(s)

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• analysis • problem solving • planning and organising • communication • documenting
Required knowledge:
• processing requirements of products • capabilities of equipment • abilities and skills of personnel

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package

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EVIDENCE GUIDE	
Overview of assessment requirements	The assessment should confirm the ability to understand and monitor a levelled demand pull system of manufacturing..
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of pull system improvement undertaken should be available
In what context should assessment occur?	Assessment will need to occur in an organisation using a pull system or by project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment
What evidence is required for demonstration of consistent performance?	Generally a number of continuous improvements will be required to generate sufficient evidence
What are the specific resource requirements for this unit?	Access to an organisation using a pull system.

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Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Pull system	A pull system is a manufacturing system is one where: • manufacturing is done to order and not for holding large inventories of parts and completed stock • work flow along the production line is done according to demand pull from the next work stage • manufacturing is in response to customer demand The pull system must therefore be flexible and have cycle times set by parameters calculated from customer demand indicators
Pacemaker	Pacemaker processes is that process which sets the pace for the flow of manufacturing work through the enterprise
Types of inventories	Inventories within process may include: • cycle stock which reflects the replenishment quantity and frequency, • buffer stock to meet demand variability and forecast errors • safety stock required to guard against quality and delivery failures upstream.
Determine cause	Determine cause may include the individual/team leader: • analysing cause themselves • identifying that expert analysis is required and requesting this • setting up an improvement team to analyse cause
Action required	Action required include actions to align actual and planned rates of production and inventories. The actions will vary but can include changes to: • production processes

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RANGE STATEMENT	
	• cycle times • equipment • work organisation • training and skill development of employees • The authority of the team leader may influence the actions required for example • actions which can be sanctioned by the individual team member • actions which can be sanctioned by the team leader • actions requiring management sanction • actions requiring expert intervention
Stakeholders	Stakeholders include: • managers • supervisors • employees • shareholders • OHS mechanisms/representatives • IR mechanisms/representatives • suppliers • customers • service providers

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT280A Undertake root cause analysis

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to undertake root cause analysis (RCA) by any person. This will often be done by people working in a team. This unit also covers the competencies needed by operators to contribute to an advanced maintenance strategy using RCA coupled with diagrams and charts.

Application of the Unit

Application of the unit	In a typical scenario, the employee works in an organisation which is applying competitive manufacturing strategies. This involves the operator 'owning' their process, taking responsibility for it, undertaking root cause analysis of problems and generally contributing to increasing the ***uptime*** and general ***Overall Equipment Efficiency*** (***OEE***). This unit requires an ability to seek and apply information from a variety of sources in order to inform problem solving analyses. Initiative and enterprise is also required to identify quick fix and permanent solutions to problems.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Recognise problems	1.1. Identify equipment/plant characteristics indicative of a problem 1.2. Identify process conditions/product characteristics indicative of a problem 1.3. Use appropriate techniques/charts to define the problem
2. Implement quick fix	2.1. Recommend/implement a quick fix within the scope of competency and authority 2.2. Use technology or processes relevant to the problem to implement quick fix
3. Determine root cause	3.1. Identify a range of possible causes 3.2. Gather information to eliminate/confirm causes 3.3. Construct a cause and effect diagram from available data 3.4. Seek assistance as required 3.5. Identify root cause
4. Develop permanent solution	4.1. Identify a range of methods of eliminating the root cause/ breaking the ***cause tree*** 4.2. Select the most appropriate solution

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ELEMENT	PERFORMANCE CRITERIA
	4.3. Liaise with relevant people 4.4. Recommend or implement solution within the limits of competency and authority 4.5. Monitor impact of solution and make further recommendations as required

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• analysis • problem solving • communication • documenting
Required knowledge
• root cause analysis methodology • indicators of a problem • principles of the process sufficient to undertake a RCA and propose solutions • use of relevant analysis tools (eg cause/effect diagrams, Pareto charts, 4W)

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. it is essential for assessment and must be read in conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant training package	
Overview of assessment requirements	The competent operator will be able to recognise problems in their process and undertake a root cause analysis, either alone or with assistance and propose permanent solutions.
What are the specific resource	Access to an organisation using root cause

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EVIDENCE GUIDE	
requirements for this unit?	analysis.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of root cause analyses undertaken should be available.
In what context should assessment occur?	Assessment will need to occur in an organisation implementing root cause analysis or by simulation or project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other units dealing with the improvement of the process. This unit could be co-assessed (and delivered) with: • *MSAPMSUP390A Use structured problem solving tools* • *MEM15001B Perform basic statistical quality control*. This unit is related to *MSACMT281A Implement a predictive maintenance strategy* as root cause analysis is one tool used in predictive maintenance.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.

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EVIDENCE GUIDE	
What evidence is required for demonstration of consistent performance?	Generally a range of root cause analysis activities will be required in order to generate sufficient evidence.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Root cause	There are many possible causes of any problem. Eliminating some will have no impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem.
Cause tree	The series of causes is referred to as the cause tree. Not all root causes are accessible and able to be eliminated. Breaking the cause tree is such a way that the problem cannot recur is an acceptable alternative. Not all situations can wait for the ***root cause analysis*** and eventual elimination of the root cause as there are serious current impacts. The ***quick fix*** will control these immediate impacts, but does not eliminate the root cause.
Uptime	Uptime refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%.
Appropriate techniques/charts	Appropriate techniques/charts may include the following: • control charts • Pareto charts

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RANGE STATEMENT	
	• run charts • flow charts • cause and effect diagrams • tree diagrams • 4W analysis.
Overall Equipment Efficiency (**OEE**)	Overall Equipment Efficiency (OEE) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, re-works and start up waste.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT261A Use SCADA systems in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed by an employee to interact with a System Control and Data Acquisition (SCADA) system as part of their job.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has introduced a SCADA system which employees now must interface with. The employee will need to access this system as part of their routine and take actions based on the information they get from the SCADA system in accordance with procedures. This unit requires the application of skills associated with using communication tools and technology for management of own work, planning and problem solving.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use operator interface	1.1. Use keyboards, track ball, monitor and/or stand alone controllers to access/interrogate system 1.2. Find all relevant screens and information 1.3. Acknowledge messages 1.4. Input and output information
2. Use information	2.1. Obtain data and information from the SCADA as required, including process, ***supply*** and ***product*** chain data 2.2. Interpret data and information as required by own job 2.3. Find and use relevant historical data and information 2.4. Use manufacturer manuals or specifications as required to expand knowledge of SCADA system relevant to own work 2.5. Determine and prioritise required actions
3. Make required changes in accordance with procedures	3.1. Adjust production/process in response to SCADA information 3.2. Record adjustments and variations to specifications/ schedules and report to appropriate personnel 3.3. Seek feedback and information on adjustments to further improve procedures where required

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• keyboarding/mousing • communication • teamwork • problem solving
Required knowledge
• technical knowledge and skills needed to operate process • hierarchy of SCADA system and operation • information available from and controls exercised by/through the SCADA system

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The employee will routinely use the relevant parts of the SCADA system for their job.
What are the specific resource requirements for this unit?	Access to an organisation using a SCADA system.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of routine use of SCADA as part of their job is required.
In what context should assessment occur?	Assessment needs to occur in a workplace using a SCADA system or using a SCADA simulation program.
Are there any other units which could or should be assessed with this unit or which relate directly to this	This unit should be assessed concurrently with relevant technical units for the process.

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EVIDENCE GUIDE	
unit?	This unit covers the lowest skill level aspects of SCADA. *MSACMT461A Facilitate SCADA systems in manufacturing team or work area* and *MSACMT660A Develop the application of enterprise systems in manufacturing* cover the intermediate and highest skill levels of SCADA in CM respectively.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence of routine use over an extended period should be available. SCADA systems will typically log all interactions with it. Interrogation of the SCADA system will therefore provide evidence of the operator's use of it. Actions taken may also be accessible from the SCADA system itself, or may need other evidence available from the process.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold

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RANGE STATEMENT italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
System Control and Data Acquisition (**SCADA**)	System Control and Data Acquisition (SCADA) is a general term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information to personnel for action. In the continuous manufacturing sector, the SCADA system is sometimes integrated into other sophisticated computer control systems such as Distributed Control System (DCS) and indeed these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system). SCADA systems may provide information from outside of the process, such as stock/material levels in a customer plant and/or available supply, supply rates and pricing from a supplier plant. This information may all be accessed by the SCADA system and the employee using it in order to make production rate and other control decisions (either automatically or human assisted) about their own process.
Supply and product chains	The supply chain is all suppliers in the chain from the initial raw material up to the current step in the manufacturing process. The product chain is all steps after the current step up to the final customer. Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the value chain (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets,

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RANGE STATEMENT	
	temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMT260A Use planning software systems in manufacturing

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to access planning software (often known as ERP, MRP, MRPII, and often by its brand name, such as SAP) to make routine business decisions required of the person as a regular part of their job.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has introduced a planning software system which the employees now must interface with. At its simplest level this is just an information system. However when fully implemented the ***planning software*** system can be used as a tool for decision making. This unit requires the application of communication, planning, and problem solving associated with using planning software in own work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Use interface	1.1. Use keyboards, track ball/mouse and monitor and/or other peripherals to access system 1.2. Navigate through the system and the screens 1.3. Acknowledge messages 1.4. Input and output information in the required format
2. Access information	2.1. Obtain relevant data and information from the system 2.2. Identify the status of items in the ***value chain*** 2.3. Access historical data and information 2.4. Interpret information and prioritise actions
3. Take appropriate actions in accordance with procedures	3.1. Take actions in response to information 3.2. Follow up as appropriate to ensure anticipated results have occurred 3.3. Record adjustments and variations according to procedures 3.4. Identify any learning needs to use planning software and seek appropriate support

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• keyboarding/mousing • communication • teamwork • problem solving
Required knowledge
• technical knowledge and skills needed to operate process • hierarchy of planning software system and operation • information available from and business activities exercised by/through the planning software system

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The employee will routinely use the relevant parts of the planning software system for their job.
What are the specific resource requirements for this unit?	Access to an organisation using a planning software system.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of routine use of planning software as part of their job is required.
In what context should assessment occur?	Assessment needs to occur in a workplace using a planning software system or a simulation system.
Are there any other units which could or should be assessed with this unit or which relate directly to this	This unit should be assessed concurrently with relevant technical units for the process. This unit covers the lower skill levels of using planning

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EVIDENCE GUIDE	
unit?	software. *MSACMT460A Use planning software systems in manufacturing* and *MSACMT660A Develop the application of enterprise systems in manufacturing* cover the intermediate and highest skill levels in the CM respectively.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence of routine use over an extended period should be available. Planning software systems will typically log all interactions with it. Interrogation of the planning software system will therefore provide evidence of the operator's use of it. Actions taken may also be accessible from the planning software system itself, or may need other evidence available from the process.

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Planning software	Planning software is a general term applied to a number of software systems which integrate a range of business information such as finance, logistics maintenance and production. It is frequently referred to by names such as ERP, SAP, MRP/MRPII.
Value chain	Competitive manufacturing organisations encompass the entire production system, beginning with the customer, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the ***value chain*** (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning.
Procedures	Procedures includes all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

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Functional area

Functional Area	

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MSACMT230A Apply cost factors to work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed for an individual to identify cost components and to be able to determine in general terms the cost impacts of alternative actions.

Application of the Unit

Application of the unit	In a typical scenario, a person is required to contribute to and be involved in the assessment of cost factors in their work. This may be done individually or in a team environment. The person is able to assess the relative costs of the alternatives and use this as one of the key factors in making decisions. Decisions are made within the scope of the employee's authority and according to procedures. Typical decisions include those that contribute to the efficient organisation of own work and the improvement of production time and cycle times. This unit requires the application of skills associated with problem solving to identify cost factors and cost implications of own work and self management to apply cost effective practices.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify in own work area major cost components of product or process	1.1. Identify ***cost components*** in the product or ***process*** in own work area 1.2. Recognise the impact of current or alternative actions on costs
2. Identify constraints to cost efficiency	2.1. Identify required production/process rate and major costs 2.2. Identify costs factors under the control of the individual or team 2.3. Relate identified costs factors to impact on ***overall cost*** of production/process 2.4. Identify cost factors that are a constraint to cost efficiency in own work area
3. Apply cost efficient work practices	3.1. Express the implications of possible actions/changes to improve cost efficiency in simple financial terms 3.2. Identify non-financial implications of proposed changes in discussion with relevant people

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Select actions which minimise overall costs 3.4. Monitor actions to ensure cost efficiency in own work area is maintained

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• basic numeracy • problem solving • communication
Required knowledge
• cost components of products made • costs concepts such as expense and income • major cost contributors to product (eg energy) • the difference between internally and externally controlled costs • difference between overhead, labour and consumables

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will as part of their routine decision making aim to minimise costs. There should be evidence of their doing so.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies. No other specific resources are required.
What critical aspects of evidence are required to demonstrate competency	Evidence of being able to identify costs factors

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EVIDENCE GUIDE	
in this unit?	relevant to an individual's job. Evidence of having made appropriate decisions to minimise overall costs.
In what context should assessment occur?	Assessment will need to occur in a workplace or by use of a work based case study.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units on continuous improvement.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be available over a period of time or from more than one process or product.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold

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RANGE STATEMENT italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Cost components	Cost components include fixed and variable costs such as power/energy, materials, plant and equipment, production or process time including impact on salary and wages, office expenses such as telephone and government taxes and charges.
Process	Process may include a production, maintenance, logistics or office process in a manufacturing environment.
Overall cost	Overall cost may include the assessment of negative and positive financial implications. It also includes negative long term issues, such as Occupational Health and Safety (OHS), environmental and regulatory issues.

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	

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MSACMS405A Lead a manufacturing team using a balanced score card approach

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required to lead a team in a manufacturing organisation where a balanced score card approach is used.

Application of the Unit

Application of the unit	This unit applies to an environment where a team is operating in a manufacturing enterprise and the competitive manufacturing strategy of the enterprise is the balanced scorecard. The team leader is required to use balanced score card information to lead, assist and motivate team members and suggest improvements to both team effectiveness and the balanced score card strategy. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning and organising in order to provide leadership in the interpretation, review and strategic response to balanced score card results. This unit has a strong emphasis on identifying and planning required performance measures and requires an ability to use new information to improve performance.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Interpret balanced score card results.	1.1. Identify pattern(s) of performance shown on strategy map 1.2. Identify ***actions indicated*** by score card results 1.3. Discuss results with team members and other relevant stakeholders 1.4. Develop required actions with team members 1.5. Develop implementation plans with team members 1.6. Facilitate the implementation of required actions from developed plans 1.7. Follow up on implementation to ensure it occurs as planned
2. Review key performance indicators (KPIs) in the balanced scorecard for the enterprise and the team	2.1. Relate team key performance indicators to strategy map/strategic objective 2.2. Review the actions required by team members to meet each key performance indicator 2.3. Compare current team actions to the optimal

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ELEMENT	PERFORMANCE CRITERIA
	actions to achieve strategy 2.4. Discuss with team modifications to key performance indicators which will better meet strategy 2.5. Recommend amendments to key performance indicators to relevant personnel
3. Review reporting systems for balanced scorecard information	3.1. Review reports to ensure information needed by team and enterprise is available 3.2. Review the mix of operational and strategic information to ensure it is appropriate to the needs of the team 3.3. Review information provided for relevance and currency, and that it is meaningful and not excessive. 3.4. Recommend improvements to reports and reporting system as appropriate
4. Lead improvement to team total performance	4.1. Compare actual total team performance with desired total performance using key performance indicators and other balanced scorecard information 4.2. Discuss with team ways of improving total team performance 4.3. Lead processes for improvement in team total performance.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• identifying key performance indicators and their application at the team level • analysis • problem solving • teamwork • planning and organising • negotiating • communication

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REQUIRED SKILLS AND KNOWLEDGE
• documenting
Required knowledge:
• components of the balanced score card including perspectives, feedback loops, metrics and reporting systems • responsibilities of team personnel in a balanced scorecard strategy

Evidence Guide

EVIDENCE GUIDE The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package	
Overview of assessment requirements	Assessment should occur on the job in an environment where the balanced scorecard is being used to improve manufacturing performance.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of the use of a balanced score card should be available
In what context should assessment occur?	Assessment will need to occur in an organisation which is using or developing a balanced score card approach as a competitive manufacturing strategy
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from

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EVIDENCE GUIDE	
	supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment
What evidence is required for demonstration of consistent performance?	Generally use of a balanced score card at the team level over a period of time would be needed to generate sufficient evidence. It is unlikely that a single assessment event would provide sufficient evidence and project and portfolio approaches may be appropriate.
What are the specific resource requirements for this unit?	Access to an organisation using the balanced scorecard approach.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Balanced scorecard	The balanced scorecard is an approach to competitive manufacturing that sets out an enterprise's vision and strategy by establishing and measuring enterprise activity in a number of different perspectives in addition to the normal financial perspective. Other perspective areas are customer, environmental, internal business process and learning and growth. For each perspective area the balanced scorecard emphasises establishing and

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RANGE STATEMENT	
	measuring performance (metrics)..
Actions indicated	Actions indicated may include: • corrective action for poor results • confirming action for acceptable results • taking steps to ensure actions for good results are consistently maintained • changes to performance indicators or performance measurement

Unit Sector(s)

Unit Sector	CM Systems

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMS401A Ensure process improvements are sustained

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to ensure that the gains which have been made by using improved methods, processes and equipment are sustained as the new base line/standard to the team's area of work and so prevent regression to former practices, or digression to less efficient practices.

Application of the Unit

Application of the unit	This unit applies to an environment where continuous improvement in a manufacturing enterprise is being undertaken. The team leader or other responsible person then facilitates and implements methods of ensuring that these improvements are sustained. Improvement initiatives can be made by any of any number of methods and by teams or individuals. The unit assumes that desired levels of performance or quality are known. The unit covers ensuring that team members implement the modified processes to ensure the improvements are sustained and opportunities taken to suggest further improvements. This unit requires the application of skills associated with problem solving, initiative and enterprise, planning and organising in order to check and monitor the impacts of change. It also requires communication and teamwork in order to assess the impact of change in a team's area of work. Self management and learning will be used to continuously monitor change influences and adapt improvements according to new information and

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	feedback.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Ensure corrective actions are implemented.	1.1. Liaise with relevant people associated with the anticipated corrective action 1.2. Ensure the supply of resources (equipment, modifications, consumables, people) 1.3. Check occupational health and safety (OHS) impacts of corrective action and take action in accordance with procedures if required 1.4. Ensure workforce has relevant skill level 1.5. Negotiate solutions with relevant people to allow

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ELEMENT	PERFORMANCE CRITERIA
	implementation 1.6. Supervise implementation of corrective action 1.7. Monitor implementation of corrective action 1.8. Make required adjustments
2. Verify systems support improvement	2.1. Ensure ***procedures*** reflect improvements 2.2. Ensure training and assessment systems reflect improvements 2.3. Liaise with relevant people to ensure their support of the new modified system/s
3. Audit the change	3.1. Determine an appropriate audit period/cycle 3.2. Agree relevant measures/indicators for the improvement 3.3. ***Measure performance*** at agreed times using agreed measures 3.4. Investigate the cause/s of under performance 3.5. Take appropriate corrective action to improve performance 3.6. Reaudit the improvement on an agreed basis

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication/negotiation skills • teamwork • basic mathematics • planning • problem solving • analysing.
Required knowledge:
• existing procedures • modified procedures • overall process of manufacturing relative to improvements being made • appropriate measures of performance • business performance goals sufficient to determine best measures of improved

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REQUIRED SKILLS AND KNOWLEDGE
performance.

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to point to improvements which have been made where they have been active in designing and implementing systems for sustaining the improvement.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of having sustained improvements in the workplace and of reviewing these improvements for their real impact.
In what context should assessment occur?	Assessment will need to occur in a workplace where improvements are occurring, or where specific improvement projects are undertaken for the purpose of providing evidence of competence (among other aims). The unit may also be assessed on a project basis in a simulated environment.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with appropriate units on continuous improvement. This unit relates to a team leader ensuring that their team sustains improvements. *MSACMS201A Sustain process improvements* is a lower level unit for a person's own area of responsibility.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and

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EVIDENCE GUIDE	
	colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence should be available from multiple small changes, or from a large change which has had multiple facets implemented over a period of some months.
What are the specific resource requirements for this unit?	Access to a workplace implementing competitive manufacturing strategies, or where improvement projects can be conducted and relevant records is required. No other specific resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Systems	Systems is used to mean any/all of the equipment, process, procedures and work practices that are used to produce the product. A term often used in this context is: • Kaizen - the philosophy of continual improvement, that every process can and should be continually evaluated and improved in terms of time required, resources used, resultant quality, and other aspects relevant to the process.

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RANGE STATEMENT	
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.
Improvement	Improvement procedures in some enterprises are also known by baka-yoke which is a manufacturing technique of preventing mistakes by designing the manufacturing process, equipment and tools so that an operation literally cannot be performed incorrectly. An attempt to perform incorrectly, as well as being prevented, is usually met with a warning signal of some sort. The term poka-yoke is sometimes referred to as a system where only a warning is provided. Improvements may be sustained by use of technology so that it is impossible to do the job any other way. However, improvements may also be sustained by changes to process or procedures or other changes to the manufacturing system which, if followed, will sustain the change and this unit may be applied to all these situations.
Measuring performance	Measuring performance is not used literally and may mean the personal taking of measurements, or it may mean arranging for measurements to be taken/made by appropriate personnel. The interpretation of the measurements however is to be undertaken personally.

Unit Sector(s)

Unit Sector	CM Systems

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corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMS400A Implement a competitive manufacturing system

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to implement competitive manufacturing practices. Generally, five areas drive competitive manufacturing: cost, quality, delivery, safety/environment, and morale. In a competitive manufacturing company systems will need to be implemented which drive continuous improvement in all these areas, without one area competing unduly with another.

Application of the Unit

Application of the unit	In a typical scenario, team performance is continually reviewed against the five key areas and in liaison with other relevant people, and with the support of technical support staff, improvements in these five key areas are developed and implemented. Whereas other units may emphasise the competence to use one or more ***tools***, this unit emphasises the ability to advance on all five key areas over a moderate time period. This unit requires the application of skills associated with problem solving and initiative and enterprise in order to identify opportunities to make improvements and maximise performance. Communication, teamwork and planning and organising skills will be required to implement improvements and address any conflicts that arise. This unit also requires an ability to identify appropriate technology, and to consider and integrate feedback on how personal performance can be improved. This requires self management and learning.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Optimise the manufacturing system	1.1. Apply competitive manufacturing practices to maximise health, safety and environment performance 1.2. Apply competitive manufacturing practices to maximise quality consistency 1.3. Apply competitive manufacturing practices to maximise performance by team members 1.4. Apply competitive manufacturing practices to maximise ***customer*** benefit/cost ratio 1.5. Apply competitive manufacturing practices to reduce lead time to delivery within the scope of the team's authority and responsibility 1.6. Negotiate with relevant stakeholders to resolve

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ELEMENT	PERFORMANCE CRITERIA
	conflicts which arise 1.7. Select improvements which will deliver the greatest overall benefit for the resources required/available without reducing current performance on individual factors
2. Implement improvements	2.1. Implement the chosen improvement/s 2.2. Check the selected improvements improve the ***system*** as a whole and do not result in unintended consequences 2.3. Monitor implementation and make adjustments as required.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills:

- communication
- communication
- interpersonal relationships
- prioritising
- mathematics
- statistics
- analysing
- conducting root cause analysis
- problem solving.
- solving.

Required knowledge:

- the customers and the benefits they derive from the products
- cost components and their relationship to customer benefits/features
- the suppliers and their capabilities
- product waste
- factors causing variability in a product and how to control them
- relevant tools for their job and how to apply them
- factors impacting on the product, process and waste, particularly those wholly or partially under their control (and how to control them)
- good health safety and environment (HSE) practice and factors impacting on HSE

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REQUIRED SKILLS AND KNOWLEDGE
performance • morale and how to improve it • optimisation techniques appropriate to the organisation and the job • application of quality standards and processes.

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person should be able to continuously make improvements to all key aspects of their team/process and any change made should be of benefit to the system as a whole.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of the implementation of the competitive manufacturing system and the improvements made to product, process and team.
In what context should assessment occur?	Assessment needs to occur in an organisation implementing competitive manufacturing or using a suitable project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with a unit on continuous improvement and or units on the use of competitive manufacturing tools. This unit is related to: • *MSACMS200A Apply competitive manufacturing practices* which covers the lower skill level aspects of this competency.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and

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EVIDENCE GUIDE	
	colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence will generally come from the routine implementation of competitive manufacturing and the routine continuous improvements which flow from this. As such evidence from a range of improvements is necessary.
What are the specific resource requirements for this unit?	Access to an organisation implementing competitive manufacturing.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA)software, Enterprise Resource Planning (ERP)systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP etc.

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RANGE STATEMENT	
	• statistical process control systems including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Tools	Tools is used in this unit to mean the tools of competitive manufacturing such as 5S, 6 sigma, continuous improvement, cause effect diagrams, etc.
Customer	Competitive manufacturing organisations encompass the entire production system, beginning with the ***customer***, and includes the product sales outlet, the final assembler, product design, raw material mining and processing and all tiers of the ***value chain*** (sometimes called the supply chain). Any truly 'competitive' system is highly dependent on the demands of its customers and the reliability of its suppliers. No implementation of competitive manufacturing can reach its full potential without including the entire 'enterprise' in its planning. ***Customer*** may be interpreted to be an internal customer, but typically the benefits to the final customer should be used as the basis for the identification of waste. The operator does not need to interface directly with the external customer, but should be provided with sufficient information to enable them to identify customer benefits and features. ***Supplier*** may be interpreted to be an internal supplier, but typically the external supplier and their abilities should be known. The operator does not need to interface directly with the external supplier, but should be provided with sufficient information to enable them to identify supplier abilities.
System	A competitive manufacturing system is that holistic combination of the process, plant and equipment, procedures and practices including the skills and work organisation of the workforce which make up the

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RANGE STATEMENT	
	productive organisation.

Unit Sector(s)

Unit Sector	CM Systems

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMC413A Lead team culture improvement

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a team leader to help develop a culture within the team appropriate for achieving competitive manufacturing.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has embarked on competitive manufacturing and a team leader is required to change / improve the team culture to be consistent with that required to maximise the benefits from competitive manufacturing and to view the team as part of the whole organisation. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning, organising and self management in order to provide leadership in a changing team environment. This unit has a strong emphasis on planning and change management, but also requires an ability to learn from experience and feed new information back into strategies to improve performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Employability Skills Information

Employability skills	This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Facilitate the team's understanding of the Competitive Manufacturing Strategy.	1.1. Communicate with all team members the objectives and benefits of the ***competitive manufacturing strategy***
	1.2. Review with the team members the techniques and methods that will be used in achieving the Competitive Manufacturing Strategy
	1.3. Using a ***systems approach***, help team members understand how the team fits into the organisation
	1.4. Establish appropriate communication and team work within the team and with other teams
	1.5. Develop a work structure with the team that allows for everyone to participate in the application of the competitive manufacturing strategy
2. Facilitate application of knowledge about the importance of controlling variation in competitive manufacturing	2.1. Develop the application of a statistical approach by all team members to all relevant facets of the system with a view to reducing ***variation***
	2.2. Encourage the approach of building quality in and ensuring team members assist each other in meeting the requirement

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ELEMENT	PERFORMANCE CRITERIA
3. Facilitate the development of skills and knowledge within the team	3.1. Encourage appropriate training for all team members 3.2. Involve team members in identification of skill needs and skills gaps, and in development of a strategy for training, skills acquisition and self-improvement so as to ensure awareness, learning and commitment
4. Facilitate the development of commitment within the team to the competitive manufacturing strategy	4.1. Ensure that the team has sufficient resources and adequate equipment available to meet the requirements of the competitive manufacturing strategy 4.2. Encourage the adoption of continuous improvement 4.3. Encourage employee acceptance of responsibility for the quality of their own work 4.4. Provide continuous feed back and communication of progress at all levels in implementing the strategy. 4.5. Involve team members in relating identified problems and opportunities for improvement to the competitive manufacturing strategy, and involve them in developing any required changes, to ensure awareness, learning and commitment

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• analysis • problem solving • teamwork • planning and organising • communication • documenting

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REQUIRED SKILLS AND KNOWLEDGE
Required knowledge:
• Principles of change management • Quality philosophy, eg Deming or Six Sigma etc

Evidence Guide

EVIDENCE GUIDE The Evidence Guide describes the underpinning knowledge and skills that must be demonstrated to prove competence. It is essential for assessment and must be read conjunction with the performance criteria, the range statement and the assessment guidelines of the relevant Training Package	
Overview of assessment requirements	The competent person will be able to demonstrate the entwinement/integration of the elements of this unit in their application to the team.
What critical aspects of evidence is required to demonstrate competency in this unit?	Knowledge of change management principles underpinned by a quality philosophy such as Deming's Revised 14 points or Six Sigma principles, etc
In what context should assessment occur?	Assessment will need to occur in an organisation implementing/wishing to implement competitive manufacturing.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other relevant units.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills

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EVIDENCE GUIDE	
	beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment
What evidence is required for demonstration of consistent performance?	Evidence of consistent application of the principles and moving down the path should be sufficient evidence rathe than evidence of having arrived.
What are the specific resource requirements for this unit?	Access to an organisation implementing competitive manufacturing.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive Manufacturing Strategy	Strategies may include one or more of: • Six sigma • Lean Manufacturing • Agile Manufacturing • Just in Time • Supply chain management • Value Chain Management • Total Quality • Pro Active maintenance • Elimination of waste • Balanced Scorecard
Variation	Variation is used to mean variation from quality standards and customer requirements as expressed in production schedules and technical specifications.

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RANGE STATEMENT	
Systems approach	A systems approach enables persons to see how work gets done and effect of changes and shows the internal / external relationships through which products and services are produced and may include considerations of the role and requirements of: • customers • suppliers • employees • other value chain members • members of the public and community groups • other external individual, group or organisation. • technical processes and equipment • statutory and regulatory requirements including OHS and environment legislation and regulations • quality standards
Work structures	Teams may be self directed, cross functional etc. Structures are appropriate to the job and job steps are in a logical order

Unit Sector(s)

Unit Sector	CM Change/interpersonal

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMC411A Lead a competitive manufacturing team

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed by people who lead teams in a competitive manufacturing environment. The team may be operating in manufacturing or in a manufacturing support function e.g. maintenance, office, warehousing etc.

Application of the Unit

Application of the unit	In a typical scenario, the team leader in a ***competitive manufacturing*** organisation needs to integrate a range of knowledge and skills. The team leader must lead and assist team members to understand and apply a holistic view of their job and the team's role within the organisation and the objectives that the team must meet as part of the competitive manufacturing system used by the enterprise. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning, organising and self management in order to provide leadership in a competitive manufacturing team. This unit has a strong emphasis on planning and implementation, but also requires an ability to learn from experience and feed new information back into strategies to improve both the team's and own performance.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Facilitate the development of process and competitive manufacturing knowledge	1.1. Ensure necessary technical documentation and information about the process and ***competitive manufacturing*** is available to the team 1.2. Develop mentoring processes for team members 1.3. Structure team activities in a way which facilitates the ongoing development of the skills and knowledge of team members 1.4. Arrange for the provision of workforce development and training for team members as appropriate 1.5. Encourage team members to apply technical knowledge to the process.
2. Facilitate efficiency improvements in team activities	2.1. Ensure ***budgets***, ***operating procedures*** and other related documentation is available to the team 2.2. Assist team members apply this information to the process responsibilities of the team 2.3. Encourage team members to identify ***waste***

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ELEMENT	PERFORMANCE CRITERIA
	2.4. Develop an environment where efficiency improvements are recommended by team members
3. Resource and encourage a proactive maintenance approach	3.1. Develop communications between specialists outside the team and team members 3.2. Develop strategies to monitor and deal with ***key reliability issues*** 3.3. Resource and encourage team members to identify and take appropriate action on potential equipment problems 3.4. Arrange for workforce development and training for team members as required in proactive maintenance procedures and techniques 3.5. Involve team members in relating identified problems to the maintenance strategy, and developing any required changes, to ensure awareness, learning and commitment
4. Implement process and organisation improvements	4.1. Plan the implementation of team suggested and externally directed improvements 4.2. Facilitate team member commitment to, and involvement in, the implementation planning of improvements and to follow improvements to their conclusion 4.3. Encourage the application of the 'plan, do, measure, improve, control' approach to the job 4.4. Arrange for workforce development and training as required to facilitate continued team involvement in improvement processes 4.5. Involve team and other key personnel in identification of skill needs and means of skills acquisition to fill any identified gaps

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication techniques

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REQUIRED SKILLS AND KNOWLEDGE
• negotiation skills • information finding and analysing/using skills • team work • planning and organising • problem solving
Required knowledge:
• understanding of the competitive manufacturing process or processes used at the enterprise

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The competent person would be able to lead a competitive manufacturing team and facilitate their improving the process.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of effective team leadership would be required.
In what context should assessment occur?	Assessment needs to occur in an organisation implementing a competitive manufacturing environment or by a project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other team leader units dealing with change/improvement in the organisation.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct

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EVIDENCE GUIDE	
	observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment
What evidence is required for demonstration of consistent performance?	Evidence from one significant manufacturing improvement or change process may be sufficient. For less significant improvement or changes, a range of changes will be needed to generate sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation implementing a significant change to or in competitive manufacturing.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	***Competitive manufacturing*** is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems control and data acquisition software (SCADA), enterprise resource planning systems (ERP), Manufacturing resource planning (MRP),

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RANGE STATEMENT	
	and proprietary systems such as SAP etc. • statistical process control systems including six sigma and three sigma • just in time, kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector..
Team	***Team*** may include work teams from all sections of the organisation including production, maintenance, technical, administration/finance, sales/marketing.
Budgets	Budgets include financial, time, materials/product and other business plans which are relevant to the team and the work area.
Waste	Waste (also known as muda in the Toyota Production System and its derivatives) is any activity which does not contribute to customer benefit/features in the product. Within manufacturing, categories of waste include: • excess production and early production • delays • movement and transport • poor process design • inventory • inefficient performance of a process • making defective items Waste for this unit may include activities which do not yield any benefit to the organisation or any benefit to the organisations customers.
Key reliability issues	Key reliability issues are typically things like cleanliness, lubrication and correct adjustment which are most likely to lead to failure.

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Unit Sector(s)

Unit Sector	CM Change/interpersonal

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMC410A Lead change in a manufacturing environment

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed by people who are given the responsibility of leading change processes in a manufacturing organisation. The change may be occurring in manufacturing or in the support functions of maintenance, office, warehousing etc.

Application of the Unit

Application of the unit	In a typical scenario, change from continuous improvement is a constant in a ***competitive manufacturing*** organisation. Change can however be more significant, for example, when the move to competitive manufacturing improvement processes are made, or at other times when significant changes such as the introduction of new products, processes or equipment are made. In these circumstances one or more individuals may have a particular role of leading the change and facilitating its implementation. This unit assumes that consultation between management and workers and other relevant personnel has already occurred and the nature and extent of the change has been agreed. This unit does not cover the negotiation of change in a formal industrial relations sense but does cover the skill needed to identify real or potential change implementation issues including those that may need to be referred to formal consultation and/or dispute settlement procedures. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning, organising and self management in order to provide leadership in a change

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	environment. This unit has a strong emphasis on planning and change management, but also requires an ability to learn from experience and feed new information back into strategies to improve performance.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Define nature and impact of change	1.1. Identify enterprise aims and objectives of the change 1.2. Identify opportunities for implementation of change within team and production environment 1.3. Determine impacts of change within team and

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ELEMENT	PERFORMANCE CRITERIA
	production environment 1.4. Develop a description of the change, including its potential benefits and impacts on own work and work of team members 1.5.
2. Identify Key Performance Indicators (KPIs)	2.1. Undertake liaison with managers, engineers and other staff responsible for designing and/or implementing change 2.2. Identify Key Performance Indicators (KPIs) for own and team's area of responsibility 2.3. Communicate Key Performance Indicators (KPIs) to all relevant stakeholders 2.4. Check that data collection and processing are appropriate for Key Performance Indicators (KPIs) 2.5. Raise and resolve issues related to Key Performance Indicators (KPIs) with relevant personnel 2.6.
3. Liaise with key stakeholders	3.1. Identify key stakeholders impacted by the change 3.2. Communicate with key stakeholders within scope of authority 3.3. Identify and address ***issues and concerns*** of each stakeholder if within scope of authority 3.4. Develop and/or locate information required to address key concerns 3.5. Refer issues and concerns outside of scope of authority to appropriate personnel 3.6.
4. Develop a strategy to help work teams implement change	4.1. Develop a ***work plan*** including timetable, key performance indicators, training needs, occupational health and safety (OHS) implications, contingency plans, and responsibilities with team members and senior managers, engineers and other staff responsible for designing and/or implementing change 4.2. Make information required to support change available to team members 4.3. Communicate/circulate draft work plan to team members, supervisors, technical experts and other appropriate personnel for comment

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ELEMENT	PERFORMANCE CRITERIA
	4.4. Assess suggested changes and incorporated into work plan where appropriate 4.5.
5. Implement change	5.1. Obtain authorisation to commence change implementation in accordance with enterprise procedures 5.2. Implement change in accordance with work plan and enterprise OHS and consultation procedures 5.3.
6. Monitor implementation of change	6.1. Maintain open communication channels with all stakeholders during implementation 6.2. Monitor Key Performance Indicators (KPIs) during implementation 6.3. Encourage and facilitate improvement suggestions of team members 6.4. Identify areas requiring improvement in change implementation 6.5. Make improvements to implementation according to enterprise procedures 6.6.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication techniques • negotiation skills • information finding and analysing/using skills • teamwork.
Required knowledge:
• sufficient understanding of the process to contextualise the communication and understand the data requirements to produce the Key Performance Indicators (KPIs) • project management • motivational techniques.

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The competent person would be able to facilitate the implementation of change by effective communication with all relevant people and by facilitating improvements to the change.
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of changes facilitated would be required.
In what context should assessment occur?	Assessment needs to occur in an organisation implementing a significant change either to, or in a competitive manufacturing environment or by a project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other team leader units dealing with change/improvement in the organisation.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and

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EVIDENCE GUIDE	
	agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence from one significant change may be sufficient. For less significant changes, a range of changes will be needed to generate sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation implementing a significant change to or in competitive manufacturing.

Range Statement

RANGE STATEMENT The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA)software, Enterprise Resource Planning (ERP)systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP etc. • statistical process control systems including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of

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RANGE STATEMENT	
	competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Team	Team may include work teams from all sections of the organisation including production, maintenance, technical, administration/finance, sales/marketing.
Change	The philosophy of continual improvement is that every process can and should be continually evaluated and improved in terms of time required, resources used, resultant quality, and other aspects relevant to the process. Superimposed on this is the concept of breakthrough change when a large change/improvement is made which can shift the direction or operation of the organisation. Once such breakthrough change is the introduction of competitive manufacturing.
Issues and concerns	Issues and concerns may be communicated formally and informally and can include individual and group concerns as well as those expressed by and through industrial processes.
Work plan	A work plan can be written or informal but must include consideration of timetable, key performance indicators, training needs, OHS implications, contingency plans and responsibilities. The work plan must be capable of being coherently communicated to others.

Unit Sector(s)

Unit Sector	CM Change/interpersonal

corequisite units

Corequisite units	

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Functional area

Functional Area	

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MEM13002B Undertake occupational health and safety activities in the workplace

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying principles of Occupational Health and Safety (OHS) in the workplace and undertaking a safety risk assessment for the employee's area of responsibility.

Application of the Unit

Application of the unit	This unit applies to employees requiring additional OHS competencies beyond those inherent in their job. **Band**: **A** **Unit Weight**: **3**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply principles of OHS in a workplace	1.1. Basic OHS principles of hazard identification, risk assessment and control are described. 1.2. Understanding of OHS legislation as it is applied in the workplace is demonstrated.
2. Carry out safety audit	2.1. Regular safety audits in the area of responsibility are carried out in accordance with appropriate OHS standards.
3. Identify health and safety improvements	3.1. OHS issues and suggestions for improvements are made to OHS Representatives and Committees as appropriate. 3.2. On the basis of safety audits or as required, hazards are identified and recommendations for their control are made. 3.3. Contributions to safety improvements are made using standard operating procedures. 3.4. OHS training needs are identified.
4. Follow requirements of enterprise OHS program	4.1. Requirements of the OHS program are satisfied within the area of responsibility. This includes for example, accident investigation and emergency procedures.

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Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- performing safety audits
- making safety improvements
- initiating OHS training
- meeting requirements of the OHS program and procedures in the individual's area(s) of responsibility
- reading and interpreting audit and safety-related documentation
- following audit and OHS procedures
- entering information onto audit reports and other relevant documents
- communicating effectively about OHS activities with workplace personnel

Required knowledge

Look for evidence that confirms knowledge of:

- principles of hazard identification, assessment and control as applied to the workplace
- procedures for hazard identification, assessment and control
- application of OHS legislation in the workplace
- procedures for conducting safety audits
- safety standards applicable to the individual's area(s) of responsibility
- the frequency at which safety audits should be conducted
- procedures for implementing OHS improvements
- the means of rectifying given or identified hazards
- reasons for selecting the chosen means of rectifying the hazard
- the authority to whom recommended OHS improvements are to be reported
- procedures for making safety improvements
- requirement for OHS training in the individual's area(s) of responsibility
- objectives of OHS training
- procedures for initiating OHS training
- accident investigation procedures
- emergency OHS procedures
- the role of the individual in carrying out accident investigations and emergency procedures

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Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to undertake OHS activities in the workplace.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with undertaking occupational health and safety activities in the workplace or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

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EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Risk assessment	Risk assessment is a process that involves:
	• analysing the risk to identify influencing factors and the range of potential consequences
	• assessing:
	  • the effectiveness of existing controls
	  • the likelihood of each consequence considering exposure and hazard level
	• and combining these in some way to obtain a level of risk

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

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Co-requisite units		

Competency field

Competency field	Occupational health and safety

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MEM30016A Assist in the analysis of a supply chain

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers assisting in the analysis of value adding and non value adding activities within the supply chain.

Application of the Unit

Application of the unit	The unit applies to all fields of engineering and manufacture. The skills defined by this unit would normally be exercised under supervision. **Band**: **0** **Unit Weight**: **0**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assist in mapping the supply stream for a nominated product/process	1.1. All organisations in the supply stream are identified. 1.2. All relevant steps in own organisation are identified.
2. Assist in assessing the value added at each step	2.1. Value added and contributed by each supplier organisation is identified. 2.2. Value added by each internal step is identified. 2.3. Activities which do not add value to customer benefit/features are identified. 2.4. External/internal supply chain members are liaised with to identify methods to reduce non value adding activities. 2.5. Information is collated and assessed. 2.6. Suggestions for improvements are recorded and submitted for approval.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • communicating • planning • assessing • problem solving • analysing • prioritising • reading and interpreting • recording
Required knowledge
Look for evidence that confirms knowledge of: • purpose of supply chain analysis • methods of supply chain analysis • types of waste, non value adding activities and methods of reducing them • process used to make own product • processes employed by other members of the supply chain sufficient to have meaningful dialogue with them • safe work practices

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to assist in the analysis of a supply chain.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency

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EVIDENCE GUIDE	
	in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with assisting in the analysis of a supply chain, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work

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RANGE STATEMENT	
situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Supply stream	Encompasses the entire supply system, beginning with the raw materials, processing and all tiers of the supply chain
Value added	Is measured against its contribution to the customer benefits/features and is determined in accordance with company definitions
Non value adding activities	Includes excess production and early production, delays, movement and transport, poor process design, inventory, inefficient performance of a process and making defective items

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Engineering technician

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LMTGN4016A Contribute to the development of products or processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge required to contribute to developing products or processes within the workplace.

Application of the Unit

Application of the Unit

This unit applies to activities contributing to development of products or processes within the enterprise. It includes conducting trials to establish conformance to requirements. Judgement may be required in planning and selecting appropriate processes or procedures for self and others.

Work may be conducted in restricted spaces or exposed conditions or controlled or open environments

Work responsibilities will vary in scope according to:

- size of the workplace
- range of designs or products
- specialisation in the workplace
- workplace quality standards

Work may be conducted in small to large scale enterprises and may involve individual and team activities.

This unit is applied according to OHS and workplace practices of the enterprise, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of

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team/section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

This unit requires the application of skills associated with planning and organising the development of products or process for production. This unit also requires an ability to work with others in the team to test and asses the quality and feasibility of designs and make adjustments or modifications to specifications. Initiative, enterprise and problem solving will be used to assist in feasibility studies and develop specifications. Learning skills will be used to gather and apply new information.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
1 Interpret provisional specifications	1.1 Provisional specifications are identified
	1.2 Specifications are interpreted, in consultation with others, where required
2 Participate in feasibility studies	2.1 Requirements for feasibility study are identified, in conjunction with others, as required

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ELEMENTS	PERFORMANCE CRITERIA
	2.2 Assistance is provided in studies to assess feasibility of design and development through sampling, trial run production, consideration of machine or equipment capabilities, availability of resources, required quality and cost
3 Assist in developing or engineering product	3.1 Product or process specifications are interpreted and preliminary specifications are developed from ***feasibility study***
	3.2 Specifications are used to develop or engineer the product
	3.3 Raw materials are checked or selected to meet requirements
	3.4 Machine or equipment or skill availability are determined against requirements
4 ***Conduct trials***	4.1 Requirements for trial are confirmed and clarified, where necessary, to establish procedures and parameters
	4.2 Organisation and liaison with production area occurs, where required
	4.3 Trials are assessed in accordance with the established procedures
5 Analyse and interpret results	5.1 Results of the trials are analysed to determine performance and acceptability for production
	5.2 Analysis is interpreted to determine performance and acceptability for production
6 Report results and maintain records	6.1 Reports are prepared
	6.2 Records are maintained, where required,

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Demonstrates knowledge of:

- industry and product processes
- product and process development procedures
- machine or equipment, resource and skill capabilities within the workplace
- feasibility study procedures
- safety and environmental aspects of relevant workplace activities
- reporting processes
- OHS practices, including hazard identification and control measures
- quality practices
- workplace practices
- recording and reporting practices

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REQUIRED SKILLS AND KNOWLEDGE

Demonstrates skills to:

- carry out sampling
- check and select raw materials
- interpret specifications
- establish availability of machines
- determine availability of required skills and personnel
- select, interpret and evaluate procedures or processes
- read, interpret and follow information on work specifications, , standard operating procedures and work instructions and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry out work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence to be considered

Demonstrates skills and knowledge to:

- conduct feasibility studies
- interpret and develop specifications
- use specifications appropriately
- organise and conduct trials
- assess results of trials

Consistency in performance

Consistently applies skills and knowledge when:

- organising work
- completing tasks
- identifying improvements
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment used and work processes

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions • completing work systematically with attention to detail without damage to goods and equipment
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Feasibility studies may include:	• sampling • trial run production • consideration of machine capabilities • availability of resources • required quality • cost
Conducting trials may relate:	• confirmation and clarification of requirements • liaison with production area • allocating work • reviewing and evaluating processes and products • performing trials • interpreting data

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- analysing results

OHS practices

OHS practices must include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may include:

- manual handling techniques
- standard operating procedures
- personal protective equipment
- safe materials handling
- taking of rest breaks
- ergonomic arrangement of workplaces
- following marked walkways
- safe storage of equipment
- housekeeping
- reporting accidents and incidents
- other OHS practices relevant to the job and enterprise

Unit Sector(s)

Sector All

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LMTGN4002A Participate in product engineering

Modification History

Not applicable.

Unit Descriptor

Unit descriptor This unit covers the skills and knowledge required to participate in product engineering in a textiles, clothing and footwear (TCF) enterprise.

Application of the Unit

Application of the Unit

This unit applies to participating in product engineering in a TCF workplace where judgement may be required in planning and selecting appropriate processes or procedures for self and others. Work may be conducted in a variety of environments, including operational workplace activities, restricted space, hazardous, controlled or exposed conditions.

TCF production areas may include:

- textile production
- clothing production
- footwear production
- early stage wool processing
- cotton ginning
- leather production
- millinery
- canvas and sails production
- laundry operations
- dry cleaning operations

Product engineering may occur in relation to repetitive production runs, short runs and quick changes and can relate to fabrics, fibres, yarns, design varieties, weaves, dyes, finishes, etc.

Work may be conducted in small to large scale enterprises and may involve individual and team activities. Work is performed within defined procedures under direct supervision.

The unit is applied according to OHS and workplace practices of the

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enterprise, which may include:

- requirements prescribed by legislation, awards, agreements and conditions of employment
- standard operating procedures
- work instructions
- oral, written and visual communication
- quality practices, including responsibility for maintenance of own work quality and contribution to quality improvement of team/section output
- housekeeping
- tasks related to environmental protection, waste disposal, pollution control and recycling

This unit requires the application of skills associated with communication to interpret production specifications, calculate costs, maintain records and prepare reports. Initiative and enterprise, planning and organising and problem solving are required to examine production options and determine required variations to specifications, processes and schedules. This unit also requires an ability to learn and apply new information. Self management skills are used to ensure work meets quality and work standards.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

Employability Skills Information

Employability Skills This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Not applicable.

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Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
1 Identify and confirm specifications	1.1 Sample material or product is examined to confirm structure 1.2 Detail of structure or composition is documented, where required, to assist in production planning
2 Identify options for production	2.1 Evaluation of material or product structure is conducted to identify options for production 2.2 Options are assessed to determine most effective and efficient ***method of production***, ensuring highest quality and yield from raw materials, and ease of production 2.3 Options and recommendations are documented in accordance with workplace practices and ***OHS practices***
3 Identify potential machine or production changes	3.1 Existing resources, machines, production techniques and scheduling arrangements are examined in relation to the production requirements 3.2 Any potential requirements for change are identified and documented in accordance with workplace practices
4 Prepare ***cost*** estimates	4.1 Material requirements and economic batch sizes are identified 4.2 Labour hours, times and other statistics required are identified and estimates made 4.3 Available machine hours are determined and estimates made, where required 4.4 Overall costs are estimated and documented in accordance with workplace practices
5 Maintain records	5.1 Production planning records are maintained and reports prepared, where necessary, in accordance with workplace practices

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit

Demonstrates knowledge of:

- machines and their capabilities
- quality assurance processes; production processes and software
- products produced by the workplace and material or fabric structure (techniques)
- work and workplace organisation systems
- safety and environmental aspects of relevant workplace activities
- OHS practices, including hazard identification and control measures

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REQUIRED SKILLS AND KNOWLEDGE

- quality practices
- workplace practices
- recording and reporting practices

Demonstrates skills to:

- determine structure and composition of material or product
- make calculations, interpret and use data from various sources
- read, interpret and follow information on work specifications, standard operating procedures and work instructions and other reference material
- maintain accurate records
- communicate within the workplace
- sequence operations
- meet specifications
- clarify and check task-related information
- carry our work according to OHS practices

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Critical aspects of evidence to be considered

Demonstratesskills and knowledge to:

- confirm specifications
- assess options for method of production
- establish potential machine and production changes
- estimate costs
- apply OHS practices in production operations
- maintain accurate records

Consistency in performance

Consistentlyapplies skills and knowledge when:

- organising work
- completing tasks
- identifying improvements
- using workplace practices
- using OHS practices
- recording and reporting accidents and incidents
- assessing operational readiness of equipment used and work processes

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The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

	• recognising and adapting to cultural differences in the workplace, including modes of behaviour and interactions • completing work systematically with attention to detail without damage to goods and equipment
Resource implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Context for assessment	Assessment may occur on the job or in an appropriately simulated environment.
Interdependent Assessment	This unit may be assessed independently or in combination with other relevant units.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.

Legislative/regulatory requirements	All work must comply with relevant Federal and State or Territory legislative or regulatory requirements.
Method of production may include:	• JIT • VAM • quick response • quality circles, • team processes • benchmarking
Cost estimating may include:	• written bill of labour, order of work or plant sample
OHS practices	OHS practices must include hazard identification and control, risk assessment and implementation of risk reduction measures specific to the tasks described by this unit, and may include:

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- manual handling techniques
- standard operating procedures
- personal protective equipment
- safe materials handling
- taking of rest breaks
- ergonomic arrangement of workplaces
- following marked walkways
- safe storage of equipment
- housekeeping
- reporting accidents and incidents
- other OHS practices relevant to the job and enterprise

Unit Sector(s)

Sector All

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LMFFT4007B Sample, inspect and test products to specifications

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the competency to take product samples, identify and apply authorised testing procedures, interpret test results and report findings within a furnishing enterprise.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	Nil	

Employability Skills Information

Employability skills	This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify specifications and test procedures	1.1. Product quality specifications are read, drawings interpreted and test parameters are identified 1.2. Test methods for each required test parameter are identified and the most efficient test method is noted 1.3. Any requirement for testing by personnel external to the work area is identified and appropriate permission is obtained 1.4. Design features that impact on testing and inspection are identified
2. Select evidence	2.1. Appropriate conforming and/or non-conforming products, materials and/or waste are selected for testing in accordance with enterprise requirements 2.2. Observations of operators and copies of procedures are collected
3. Conduct and interpret tests	3.1. Tests are conducted following workplace procedures and results are documented 3.2. Comparisons of all data collected are made 3.3. Any recommendations are noted and considered for feasibility
4. Report findings	4.1. Findings of tests are documented 4.2. Any potential or existing problems and appropriate recommendations are identified and reported in accordance with enterprise procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to quality checking processes, including the relevant technical, regulatory, environmental and safety requirements • communicate ideas and information to enable clarification of the requirements, coordination of work with site supervisor, other workers and customers, and the reporting of outcomes and findings • plan and organise activities, including the obtaining of equipment, systems and materials to avoid any backtracking, workflow interruptions or wastage • work with others and in a team by recognising dependencies and using cooperative approaches to optimise workflow and productivity • use mathematical ideas and techniques to correctly complete measurements and calculations required in quality checking processes and estimation of material requirements • create and apply systematic problem solving techniques to anticipate problems, avoid re-working and avoid wastage • use the workplace technology related to quality checking, including machinery, tools and equipment, calculators and measuring devices and computing/computer-aided systems
Required knowledge
• general quality systems theory • sampling techniques for commonly encountered materials • inspection techniques and faults common within the sector products • testing techniques (destructive and non-destructive) relevant to the sector and related equipments/aids • workflow in relation to required times and stages where quality checking is required

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Critical aspects of evidence	• Interpret work order and determine test requirements • Apply safety requirements throughout the work sequence, including the use of personal protective

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EVIDENCE GUIDE	
	clothing and equipment • Follow work instructions, operating procedures and inspection practices to arrange/conduct a minimum of four different processes covering sampling, inspection and testing • Analyse test results and interpret outcomes against requirements • Modify activities to cater for variations in workplace contexts and environment • Work effectively with others
Resource implications	Production or product finishing facility, testing equipment and procedures.
Method of assessment	Assessment methods must confirm consistency of performance over time and in a range of workplace relevant contexts. Assessment should be by direct observation of tasks and/or samples of work and questioning on underpinning knowledge. Assessment should be conducted over time and will generally be in conjunction with assessment of other units of competency.
Context of assessment	Assessment may occur on the job or in a simulated workplace facility with relevant equipment, simulated work instructions and deadlines.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Unit scope	• This unit covers the work involved in collecting samples and their inspections and testing to check product quality • Extent of sampling and the nature of inspection

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RANGE STATEMENT	
	and testing will be undertaken in accordance with industry standards and practices and will reflect the type of product, the materials and processes used in its manufacture and its end use. It may include: • samples of raw materials • components, • assemblies • end products • Materials to be sampled will represent those normally used by the enterprise in its production processes. They may include but are not limited to: • timber • metal alloys • glass, fabrics and textiles • plastics • leather • adhesives • fillers and finishes as appropriate
Unit context	• OHS requirements include legislation, building codes, material safety management systems, hazardous substances and dangerous goods codes and safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislation, relevant health regulations, authorised handling procedures and organisation insurance requirements • Work requires individuals to demonstrate organisational and analytical ability, discretion, judgement and problem solving skills
Workplace environment	• Sampling, inspecting, testing and reporting of findings is undertaken in accordance with established enterprise procedures and practices • Work is generally performed with little external assistance and with minimal supervision or direction • Customers or suppliers of material to be sampled may be internal or external
Personal protective equipment	Personal protective equipment is to include that prescribed under legislation, regulations and

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RANGE STATEMENT	
	enterprise policies and practices
Information and procedures	• Work procedures/instructions • Designer/drawer specifications and instructions • Quality systems documentation or equivalent containing sampling, inspecting and testing frequency and criteria • Organisation work specifications and requirements • Legislation/regulation/national and industry codes and practices relevant to the products • Quality and Australian standards and procedures

Unit Sector(s)

Unit sector	Furnishing Technology

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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BSBRSK401A Identify risk and apply risk management processes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit describes the performance outcomes, skills and knowledge required to identify risks and to apply established risk management processes to a subset of an organisation or project's operations that are within the person's own work responsibilities and area of operation. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of endorsement.

Application of the Unit

Application of the unit	This unit applies to individuals with a broad knowledge of risk analysis or project management who contribute well developed skills in creating solutions to unpredictable problems through analysis and evaluation of information from a variety of sources. They may have responsibility to provide guidance or to delegate aspects of these tasks to others. In this unit, risks applicable within own work responsibilities and area of operation, may include projects being undertaken individually or by a team, or operations within a section of the organisation.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Identify risks	1.1. Identify the ***context*** for risk management 1.2. Identify ***risks*** using ***tools***, ensuring all reasonable steps have been taken to identify all risks 1.3. Document identified risks in accordance with relevant policies, procedures and legislation
2. Analyse and evaluate risks	2.1. Analyse and document risks in consultation with relevant ***stakeholders*** 2.2. Undertake ***risk categorisation*** and determine ***level of risk*** 2.3. Document analysis processes and outcomes
3. Treat risks	3.1. Determine appropriate ***control measures*** for risks and assess for strengths and weaknesses 3.2. Identify control measures for all risks

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ELEMENT	PERFORMANCE CRITERIA
	3.3. Refer risks relevant to whole of organisation or having an impact beyond own work responsibilities and area of operation to others as per established policies and procedures 3.4. Choose and implement control measures for own area of operation and/or responsibilities 3.5. Prepare and implement treatment plans
4. Monitor and review effectiveness of risk treatment/s	4.1. Regularly review implemented treatment/s against ***measures of success*** 4.2. Use review results to improve the treatment of risks 4.3. Provide assistance to auditing risk in own area of operation 4.4. Monitor and review management of risk in own area of operation

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- literacy skills sufficient to read and understand a variety of texts; and to write, edit and proofread documents to ensure clarity of meaning, accuracy and consistency of information
- research and data collection skills to monitor and evaluate risks
- problem-solving skills to appropriately address identified risks.

Required knowledge

- Australian and international standards for risk management
- key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as:
  - anti-discrimination legislation
  - ethical principles
  - codes of practice
  - privacy laws
  - environmental issues
  - occupational health and safety
- organisational policies and procedures relating to risk management processes and

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REQUIRED SKILLS AND KNOWLEDGE
strategies • auditing requirements relating to risk management.

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence of the following is essential: • identification, analysis and evaluation of risks • demonstrated understanding of personal role in relation to wider organisational or project context • demonstrated understanding of risk management processes and procedures.
Context of and specific resources for assessment	Assessment must ensure: • access to workplace documentation relating to risk management • access to risk management tools and frameworks.
Method of assessment	A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate for this unit: • direct questioning combined with review of portfolios of evidence and third party workplace reports of on-the-job performance by the candidate • review of documentation outlining risk analysis processes and outcomes • analysis of responses to case studies and scenarios • oral or written questioning to assess knowledge of Australian and international standards for risk management • review of implementation of treatment plans.
Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended, for example:

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EVIDENCE GUIDE	
	• general administration units • other risk management units.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Context may include:	• any related projects or organisations • any resources, including physical assets, which are vital to operations • key operational elements and service of the organisation • organisation or project, how it is organised and its capabilities • own role and responsibilities in relation to overall project or organisation design
Risks may include:	• commercial and legal relationships • economic circumstances and scenarios • human behaviour • individual activities • management activities and controls • natural events • political circumstances • positive risk • technology - technological issues
Tools may include:	• documentation to assist in process of identifying risk, and assessing impact and likelihood of occurrence • standard instruments developed for the organisation and contextualised for sections of the workplace's operations, such as checklists and testing procedures • tools to prioritise risks, including where relevant, numerical scoring systems for risks

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RANGE STATEMENT	
Stakeholders may include:	• contractors • employees • financial managers • insurance agents • managers • public • service providers • suppliers • unions • volunteers

Risk categorisation may include:	• likelihood of risks:
	  • almost certain
	  • likely
	  • possible
	  • unlikely
	  • rare
	• consequences of risks:
	  • insignificant
	  • minor
	  • moderate
	  • major
	  • catastrophic
	  • current control measures

Level of risk may include:	• low, treated with routine procedures • moderate, with specific responsibility allocated for the risk, and monitoring and response procedures implemented • high, requiring action, as it has potential to be damaging to the organisation or project • extreme, requiring immediate action, as it has potential to be devastating to the organisation or project

Control measures may include:	• hierarchy of controls:
	  • reduction in likelihood of risks
	  • reduction of consequences of risks
	  • retention of risks
	  • risk aversion
	  • transfer of responsibility of risks

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RANGE STATEMENT	
Measures of success may include:	• costs • reductions in impact • reductions in likelihood • reductions in occurrence

Unit Sector(s)

Unit sector	

Competency field

Competency field	Regulation, Licensing and Risk - Risk Management

Co-requisite units

Co-requisite units		

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PMASUP520B Review procedures to minimise environmental impact of process

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the minimisation of waste and environmental threat by a plant and/or a process. It covers all resources used and products made.

Application of the Unit

Application of the unit	

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used,

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a unit of competency.	further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish procedures for environmental management.	1.1. Establish workplace procedures of proactive environmental management which include resource conservation, pollution and waste minimisation 1.2. Determine primary source of respective aspects 1.3. Describe the negative impact of these aspects on the environment and the society if they are mismanaged 1.4. Prioritise management options according to the greatest benefit to environment and the society 1.5. Develop management procedures 1.6. Complete required documentation of implement change.
2. Review procedures for environmental management.	2.1. Review the procedures on a regular basis by consulting various work groups for feedback. 2.2. Incorporate relevant feedback into the revised procedures in consultation with the relevant personnel 2.3. Inform relevant work groups of any changes and implement changes in the procedures.
3. Implement and review an environmental management training program.	3.1. Understand the workplace environmental management training program 3.2. Review the program on a regular basis by consulting various work groups for feedback 3.3. Incorporate relevant feedback into the revised program in consultation with the relevant personnel 3.4. Inform relevant work groups of any changes and implement changes in the training program.
4. Implement and review environmental management recording system.	4.1. Understand the workplace environmental management recording system. 4.2. Review the system on a regular basis by consulting various work groups for feedback. 4.3. Incorporate relevant feedback into the revised system in consultation with the relevant personnel 4.4. Inform relevant work groups of any changes and

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ELEMENT	PERFORMANCE CRITERIA
	implement changes in the management of environmental records.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This describes the essential skills and knowledge and their level, required for this unit.
Required skills
• completing plant records • communication • problem solving.
Required knowledge

Knowledge and understanding of the control of environmental incident process and the importance of critical parameters enough to establish and review environmental management procedures within an organisation.
Competence includes the ability to apply and explain:
• nature and severity of potential environmental hazards caused by the plant/process
• sensitivity of local environment to these environmental threats
• pathways of entry to the environment from the plant
• regulatory requirements such as:
• environment protection regulations
  • OHS
  • HAZCHEM
  • duty of care
  • dangerous goods
• external licensing requirements such as:
  • EPA
  • water authorities
  • local councils
  • enterprise procedures and practices.

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Evidence Guide

EVIDENCE GUIDE
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment	Assessment of this unit should include demonstrated competence on actual plant and equipment in a work environment. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation may be required to allow for assessment of parts of this unit. Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays. This unit of competency requires a significant body of knowledge which will be assessed through questioning and the use of what-if scenarios both on the plant (during demonstration of normal operations and walk-throughs of abnormal operations) and off the plant.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Competence must be demonstrated in the ability to apply plant and process knowledge to identify and analyse environmental hazards, and establish and review procedures for environmental management. Consistent performance should be demonstrated. In particular look to see that: • a holistic 'clean production' approach to waste minimisation is taken • potential effects on the environment are understood • terms initiated are followed through until final resolution has occurred • the process/plant is understood and proposals are capable of implementation • training needs are addressed • records are kept.

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EVIDENCE GUIDE	
	These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the plant, incidents on similar plants around the world, hazard analysis activities (eg HAZOP) and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	In all plants it may be appropriate to assess this unit concurrently with relevant teamwork units, communication units and units relevant to the process equipment. In a major hazard facility, it may be appropriate to assess this unit concurrently with relevant OHS units.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the Performance Criteria, is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs if the candidate, accessibility of the item, and local industry and regional contexts.	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

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RANGE STATEMENT	

Context	This competency covers process manufacturing plants which may involve workplace hazards such as:
	• chemicals and hazardous materials
	• gases and liquids under pressure
	• materials handling.
	This competency includes:
	• legislation, codes and national standards relevant to the workplace which may include:
	  • award and enterprise agreements and relevant industrial instruments
	  • relevant legislation from all levels of government that effects business operation, especially in regard to OHS, environmental issues and industrial relations
	  • relevant industry codes of practice
	• awareness of the environment and the effects on the environment of the organisation's:
	  • liquid waste
	  • solid waste
	  • gas/fume/vapour/smoke emissions, including fugitive emissions
	  • hazardous materials
	  • excessive energy and water use
	  • excessive noise
	and the workplace practices that can be used to minimise or prevent these effects.

Information	Information may include: • organisational policies and procedures • relevant environmental legislation/regulation requirements • licence conditions • environmental treaties, conventions and national policies and strategies • National Pollutant Inventory • State of the Environment reports • voluntary environmental agreements entered into with external organisations/authorities • continuous improvement policies and processes for the organisation.
Work group	Work group may include: • formal or unstructured groups

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RANGE STATEMENT	
	• two or more people.
Proactive environmental management	Proactive environmental management may include: • resource conservation and efficiency • minimisation of waste • recycling • reduction in use of non-renewable resources • maximisation of product yield from raw materials • reduction in volume of pollutants made • reduction in concentration/intensity of pollutants made • reduction in emissions.
Approaches to proactive environmental management	Some approaches to proactive environmental management may include: • preventing and minimising the production of pollution, eg discharges to air, land and water, hazardous waste • improving housekeeping, eg using a broom instead of a hose, using old rags for cleaning instead of toxic cleaners or water • substituting materials, eg replacing toxic solvent based coatings with water based ones • changing processes, eg mechanical cleaning, re-design of products/ procedures so that materials are used more efficiently.
Environmental management policies	Environmental management policies must be appropriate to the scope and scale of the enterprise and may include: • environmental load reduction and waste minimisation • tenders for the provision of goods and services that specify environmentally preferred selection criteria • protection of land and habitat • environmentally sustainable work practices.
Typical functions	Typical functions may include: • examining plant records • examining operating procedures and practices • liaising with a range of internal people
Health, **safety and environment** (**HSE**)	All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

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Unit Sector(s)

Unit sector	Support/generic

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974009A Undertake field-based, remote-sensing monitoring

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to organise and undertake a defined field-based, remote-sensing monitoring activity. This may include assembling, setting up and checking appropriate monitoring equipment on-site, sampling, data collection and storage, equipment and system maintenance, and associated field testing and laboratory analysis. This unit of competency does not cover developing specific monitoring protocols or detailed design and/or construction of instruments, buildings, structures associated with the remote-sensing monitoring activities.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical, field and environmental officers working in the environmental services, geotechnical, construction materials testing and mining industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Confirm monitoring requirements with supervising staff	1.1. Clarify the purpose, objectives and the preferred site for the remote-sensing activities 1.2. Review all emergency and risk assessments, safety and environmental requirements and data quality procedures for the field activities 1.3. Clarify details of all field parameters to be monitored and the preferred monitoring and data quality procedures 1.4. Confirm final data formats will suit stakeholders who receive or use the data 1.5. Clarify details of any statutory requirements that apply to the site and associated field activities 1.6. Review existing remote-sensing monitoring protocols, and siting standards or associated in-house

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ELEMENT	PERFORMANCE CRITERIA
	requirements which relate to the field activities
2. Assemble remote-sensing field monitoring system	2.1. Identify required instruments, equipment and consumables and associated maintenance and replacement procedures 2.2. Identify site access, services and security requirements and any site constraints 2.3. Complete all administrative requirements and obtain appropriate approvals 2.4. Confirm required instrument calibration and data storage, handling and transfer systems 2.5. Field-check site suitability for monitoring activities and define alternative sites as necessary 2.6. Assemble remote-sensing monitoring system and check all components under laboratory conditions
3. Organise and establish the remote-sensing monitoring site	3.1. Identify, and confirm with senior staff, all resources required for operation of monitoring system in the field 3.2. Confirm that all safety, emergency and risk assessment requirements and data quality procedures have been correctly applied to the field activities 3.3. Ensure correct packaging and transportation of equipment and instruments to defined field site 3.4. Establish remote monitoring station 3.5. Test operation of total system under field conditions
4. Operate and maintain monitoring site	4.1. Undertake regular or emergency inspections of the site according to set procedures 4.2. Undertake calibration checks according to written instructions 4.3. Inspect and maintain all instruments, equipment and data systems and organise replacement of defective items 4.4. Perform all field and laboratory activities safely and with minimal impact on the environment 4.5. Document all site visits and associated actions 4.6. Review the total monitoring activity on a regular basis and implement any required modifications or improvements
5. Close down field monitoring activities	5.1. Confirm decision to close down site and finalise all data requirements with supervising staff 5.2. Dismantle monitoring system and arrange checking, packaging and transportation of all equipment and

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ELEMENT	PERFORMANCE CRITERIA
	instruments back to base 5.3. Close down site in accordance with enterprise and environmental requirements 5.4. Hand back site and inform all relevant authorities 5.5. Test, decontaminate, if required and store all equipment appropriately 5.6. Document all close-down actions

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- assembling, testing, operating and closing down a field-based, remote-sensing monitoring system under laboratory/field conditions
- automatic and manual sampling and calibration procedures
- communicatingand negotiating effectively and efficiently with staff and other relevant parties
- identifying and interpreting statutory requirements accurately
- confirming type, quantity and quality of data needed for defined monitoring activity
- undertaking reconnaissance and evaluating monitoring sites
- identifying and establishing a secure field monitoring site according to defined criteria
- packaging and transporting supplies, equipment and instruments into the field
- responding effectively to changed or unforeseen circumstances

Required knowledge

Required knowledge includes:

- purpose and objectives of the monitoring, including:
  - information and analysis required
  - end users of information
  - significance of outcomes for broader programs
- terminology relevant to field monitoring activities
- field monitoring aims and objectives

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REQUIRED SKILLS AND KNOWLEDGE
• remote-sensing monitoring protocols • statutory requirements regarding monitoring activities • technical capabilities and limitations of remote-sensing equipment and instruments • fundamentals of field-based, remote-sensing monitoring systems • fundamentals of field instrument fault identification and rectification procedures • data storage, analysis and presentation procedures • data quality procedures • field safety requirements and emergency plans • environmental requirements regarding field activities • enterprise and/or legal traceability requirements • relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can:
	• demonstrate understanding of purpose and objectives of the monitoring, including:
	  • information and analysis required
	  • end users of information
	  • significance of outcomes for broader programs
	• communicate effectively and efficiently with staff and other relevant parties
	• identify and interpret statutory requirements accurately
	• confirm type, quantity and quality of data needed for defined monitoring activity
	• demonstrate ability to assemble test, operate and close down a field-based, remote-sensing monitoring system under laboratory/field conditions
	• undertake reconnaissance and evaluate monitoring sites
	• identify and establish a secure field monitoring site

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EVIDENCE GUIDE	
	according to defined criteria • demonstrate ability to appropriately package and transport supplies, equipment and instruments into the field • negotiate with staff and stakeholders and reach satisfactory agreements, where possible • respond effectively to changed or unforeseen circumstances.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL935004A Maintain instruments and equipment*. Resources may include: • vehicles, monitoring and communication equipment, consumables and manuals • work program, enterprise procedures, codes of practice and field protocols.

Method of assessment	The following assessment methods are suggested:
	• review of data and results obtained by the candidate
	• feedback from supervisors and peers
	• observation of work carried out under laboratory conditions with a focus on:
	  • automatic and manual sampling and instrument calibration procedures
	  • assembling, checking and operation remote-sensing monitoring systems
	  • recording, storing, analysing and presenting basic monitoring data
	• observation of work carried out in the field with a focus on:
	  • identification of monitoring site according to defined criteria
	  • identification and recording of required services and security requirements for the site
	  • identification and recording of potential environmental impacts associated with operation of a defined monitoring site
	• simulation exercises with a focus on:
	  • accident and emergency situations
	  • basic environmental impact assessment of a field

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EVIDENCE GUIDE	
	site • loss of communication system and implementation of alternative procedures • demonstration of calibration, use, and general maintenance of monitoring equipment • oral and/or written questions to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Environmental** A report by an environmental consultant indicates that a major regional city requires two remote-sensing air quality monitoring stations to adequately meet its air quality monitoring objectives. In conjunction with senior staff, a senior technical officer is instructed to relocate the existing monitoring station in the central business district, as it does not meet the new Australian standard for locationing and siting of such a monitoring station and to develop a new station in an outer suburban area. The two remote-sensing monitoring stations must meet all siting and location standards, operate unsupervised for up to seven days, produce data in a form suitable for direct inclusion into the Territory's State of Environment Report, and meet all statutory and enterprise requirements. The technical officer is required to clearly identify and document the above requirements, negotiate

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EVIDENCE GUIDE	
	with all relevant authorities regarding siting, supply of services, access and security, as well as design, assemble and establish the remote-sensing monitoring system. Ongoing operation, maintenance and annual evaluation are also the responsibility of the senior technical officer in conjunction with senior staff.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	  • AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 4501 Set:2008 Occupational clothing set
	• Australian code of good manufacturing practice for medicinal products (GMP)
	• Australian Dangerous Goods Code
	• Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice
	• calibration procedures
	• data quality procedures

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RANGE STATEMENT	
	• enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogues and handbooks • equipment operating manuals • field protocols, procedures, note books and log books • general maintenance and repair procedures • government policy (e.g. sustainable development and impact assessment) • incident/accident/injury report forms • instrument fault finding procedures • material safety data sheets (MSDS) • national environment protection measures • National Health and Medical Research Council (NHMRC) Guidelines • national measurement regulations and guidelines • occupational health and safety (OHS) national standards and codes of practice • principles of good laboratory practice (GLP) • remote-sensing monitoring protocols • requirements related to protection of the environment • site-specific requirements • specific environmental standards • standard operating procedures (SOPs) • Therapeutic Goods Regulations 1009
Remote-sensing monitoring activities	Remote-sensing monitoring activities may include: • meteorology (e.g. temperature, humidity and wind) • geology/mining (e.g. movement of structures, vibration and blast shock waves) • hydrology (water flow and water depth in catchment) • environmental (e.g. air quality, water quality and noise) • civil engineering (e.g. temperature, displacement and/or hydrostatic pressure on structures and movement of ions in structures)
Communication and/or consultation strategies	Communication and/or consultation strategies may include:

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RANGE STATEMENT	
	• face-to-face • telephone • written documents • meetings
Purpose of field monitoring activities	Purpose of field monitoring activities may include: • single or multiple site monitoring • component of enterprise environmental management plan • remote-sensing monitoring of physical/chemical and mechanical/geotechnical parameters • monitoring of consolidation of soils, foundations • monitoring the durability of structures (e.g. roads) • requirement to comply with statutory requirements • requirement to comply with industry sampling/monitoring protocols/codes of practice
Related plans and procedures	Related plans and procedures may include: • risk assessments • safety and accident/injury plans • emergency plans and procedures, and access to nearest medical services • environmental impact assessment procedures • pollution prevention procedures • first aid and survival procedures
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects • power tools, generators and moving machinery • vehicle and boat handling in rough/remote conditions
Safety procedures and control	Safety procedures and control measures may

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RANGE STATEMENT	
measures	include: • use of personal protective equipment, such as sunscreen, hats, safety glasses, gloves, coveralls and safety boots • 'stay with vehicle' and other survival techniques • regular communication schedule • global positioning system (GPS), maps and aerial photos • handling, storage and disposal of all hazardous materials/waste in accordance with MSDS, labels, enterprise procedures, codes and regulations
Administrative requirements and appropriate approvals	Administrative requirements and appropriate approvals may include: • travel requisitions • authority for use of vehicles and equipment • permits • insurance
Instruments and equipment	Instruments and equipment may include: • navigation and communication equipment (e.g. compass, maps, GPS, two-way radio and mobile phone) • sampling and autosampling equipment for air, water, storm water, waste water and sewage • instruments that measure air pollutants (e.g. oxides of carbon, oxides of sulphur, oxides of nitrogen, hydrocarbons and particulates (PM10, PM2.5 total suspended, ozone)) • instruments that measure water quantity and/or hydrological parameters (e.g. flow, dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature) • instruments that measure meteorological parameters (e.g. pressure, minimum and maximum temperature, wet and dry bulb temperatures, humidity, rainfall, and wind speed and direction) • instruments that measure sound pressure levels (e.g. noise or sound pressure meter) • instruments that measure displacement or durability of civil engineering structures,

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RANGE STATEMENT	
	consolidation (e.g. load cells, inclinometers, piezometers, strain gauges and accelerometers)
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL974007A Undertake environmental field-based monitoring

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to organise and undertake field monitoring programs that are primarily focused on the determination of physical and chemical parameters and/or observation and documentation of biological/ecological systems. It covers confirming the requirements of the monitoring activities, sampling, sample handling, physical and chemical monitoring and simple field-based analysis, data collection and recording. It also covers field camp maintenance and field safety. The unit of competency covers gaining clearance for animal trapping, tagging, keeping or experimentation, but does not cover specific animal handling techniques. These tasks would only be performed under the guidance and supervision of a scientific officer.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical, field and environmental officers working in the construction materials, mining and environmental services industry sectors. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Confirm requirements for field monitoring activities with supervising staff	1.1. Clarify the purpose, objectives and the defined site for the field monitoring activities 1.2. Review all emergency plans, risk assessments, and safety and environmental requirements associated with the field activities 1.3. Review and discuss the detailed work program with supervising staff 1.4. Clarify the need for permits and any access restrictions or local concerns at field site 1.5. Clarify details of all samples to be collected and

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ELEMENT	PERFORMANCE CRITERIA
	field parameters to be measured 1.6. Confirm final data formats will suit stakeholders who receive or use the data 1.7. Review existing in-house protocols and/or associated in-house requirements that relate to field sampling, monitoring and data quality procedures
2. Prepare for field monitoring activities	2.1. Develop checklists, based on work program, to facilitate correct preparation of field activities 2.2. Identify and implement all actions required under enterprise emergency plan, risk assessment, and environment, safety and data quality procedures 2.3. Complete all administrative requirements and obtain appropriate approvals/permits 2.4. Prepare and check all instruments, equipment, materials and supplies required to implement field program 2.5. Confirm, correct and safe use of equipment and details of field activities with supervisor 2.6. Arrange and check correct operation, packaging and transportation of all supplies and equipment 2.7. Arrange all additional pre- and post-monitoring activities
3. Perform field activities	3.1. Establish and maintain field camp in accordance with enterprise procedures, as necessary 3.2. Perform field sampling, monitoring, data collection and recording as per the agreed work program 3.3. Label all samples and complete data sheets and field log book in accordance with enterprise procedures 3.4. Store samples/specimens in accordance with any special requirements for continued wellbeing, viability or integrity 3.5. Perform all tests and operate all equipment according to enterprise instructions 3.6. Store and maintain equipment and, where appropriate, calibrate instruments during field activities 3.7. Perform all activities safely with minimal impact on the environment
4. Close down field monitoring activities	4.1. Arrange and check final packaging and transportation of all samples, equipment and supplies back to home base

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ELEMENT	PERFORMANCE CRITERIA
	4.2. Ensure that monitoring/camp site is left in accordance with enterprise and environmental requirements 4.3. Ensure all samples and data are stored safely 4.4. Ensure dispatch of collected samples for subsequent analysis 4.5. Test and, if required, decontaminate equipment before storage 4.6. Report results/noting any anomalies with users, data analysers and/or supervisor

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- field sampling and monitoring procedures, including labelling and traceability
- demonstrating correct and safe use, under laboratory and field conditions, of field instruments and/or equipment (including field calibration)
- identifying and rectifyingbasic instrument faults
- collecting and preserving plants and animals to enable subsequent identification
- operating communication systems
- operating transportation systems
- applying data quality procedures under field conditions
- locating and managing of monitoring sites
- communicating effectively and efficiently
- reviewingand documenting emergency, safety or environmental field plans
- developing checklists covering instruments, equipment and associated supplies
- maintaining, storing and transporting samples/specimens to ensure their wellbeing, viability and integrity
- working safely for the protection of self and others
- negotiating with staff and stakeholders and reaching satisfactory agreements, where possible
- responding effectively to changed or unforeseen circumstances

Required knowledge

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REQUIRED SKILLS AND KNOWLEDGE

Required knowledge includes:
• purpose and the objectives of a field activity, including:
  • information and analysis required
  • end users of information
  • significance of outcomes for broader programs
• risk assessment principles
• technical capabilities and limitations of common equipment and instruments
• specific legislation and codes of practice related to sample and animal collection
• a range of chemical and physical field monitoring procedures
• enterprise procedures for the recording of field data
• relevant health, safety and environment requirements, including field safety/survival principles

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can:
	• demonstrate understanding of the purpose and objectives of a field activity, including:
	  • information and analysis required
	  • end users of information
	  • significance of outcomes for broader programs
	• communicate effectively and efficiently with staff and other relevant parties
	• review a written work program and define the major field activities
	• review emergency, safety or environmental field plans and document the key aspects which relate to a defined field activity
	• develop accurate and complete checklists covering instruments, equipment and associated supplies necessary for a defined field activity
	• apply sampling, testing and data quality procedures

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EVIDENCE GUIDE	
	accurately under field conditions • prepare, check and calibrate field instruments • demonstrate correct and safe use, under laboratory and field conditions, of field instruments and/or equipment (including field calibration) • define and correctly prepare sample containers for different field samples • take samples, under field conditions, according to defined procedures • maintain, store and transport samples/specimens to ensure their wellbeing, viability and integrity • pack and transport supplies, equipment and instruments to and/or from a field site • accurately perform field tests according to written instructions • record data and information, conduct quality checks and field analysis • work safely for the protection of self and others • negotiate with staff and stakeholders and reach satisfactory agreements, where possible • respond effectively to changed or unforseen circumstances.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL945001A Maintain laboratory/field workplace safety* • *MSL954001A Obtain representative samples in accordance with sampling plan*. Resources may include: • vehicles, survey equipment, sampling/monitoring equipment, consumables and manuals • work program, enterprise procedures, codes of practice and field protocols.
Method of assessment	The following assessment methods are suggested: • review of field data and results obtained by the candidate • feedback from supervisors and peers • demonstration of understanding of existing work program requirements by:

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EVIDENCE GUIDE	
	• developing a checklist of the resources required to carry out a defined work program • developing a list of all pre-and post-monitoring requirements • observation of fieldwork performed by candidate with a focus on: • sample collection, preservation, storage and transportation • field sampling and monitoring procedures • accurate data recording • safety, emergency and environmental aspects of monitoring activity • communication techniques • general site reconnaissance • response to simulation exercises with a focus on: • accident and emergency situations • basic environmental impact assessment of a field site • loss of communication system and implementation of alternative procedures • demonstration of calibration, use and general maintenance of field instruments and equipment • oral and/or written questions to assess underpinning knowledge. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case studies below to illustrate the practical application of this unit of

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EVIDENCE GUIDE	
	competency and to show its relevance in a workplace setting. **Environmental** (**1**) A technical officer in an environmental protection authority is required to undertake an emergency monitoring program in a small catchment following a public complaint that a small industrial site has illegally discharged a concentrated sodium chloride/acid mixture into a nearby creek system. The monitoring program requires three samples to be taken above and three samples below the industrial site over a distance of two kilometres. Additional tests covering electrical conductivity, pH, temperature and turbidity are to be done in situ at the same time as when the samples are taken. All samples and monitoring procedures are to be clearly documented and undertaken according to statutory and enterprise requirements, as the results may potentially be required to be presented and cross-examined in court. All of the above planning, implementation and reporting must be completed within 24 hours. **Environmental** (**2**) A technical officer is involved in a four day lake survey 100 km from the laboratory. The survey is designed to collect many water samples and undertake netting activity to determine the variety and food requirements of fish in the lake. The technical officer is responsible for collecting the water samples, in accordance with the predetermined sampling plan and enterprise sampling procedures, and disposing of the fish samples after they have undergone field-based gut analysis. Given the large number of water samples and the duration of the field trip, the technical officer arranges for the hire of several 3-way camping refrigerators (gas/12V/240V) to store and transport the water samples at 4°C and for appropriate supervised burial of the fish samples at a local council landfill. In addition, he/she prepares, checks and packs all the supplies and equipment. **Environmental** (**3**) In preparation for a major field trip to collect soil samples in a remote location, a technical officer spent several weeks ensuring that all arrangements were in place. The officer confirmed access to the site and located suitable maps, aerial photos and reconnaissance

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EVIDENCE GUIDE	
	data. The logistics of food, water, hygiene, fuel, transport, communications and safety were planned with senior staff to suit the fieldwork location, duration and personnel involved. The vehicles were serviced in preparation for remote off-road work and a full complement of spares was assembled. All supplies and field equipment were purchased or assembled, checked against an inventory and securely stowed in the vehicles.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include:
	• Australian and international standards such as:
	  • AS 1678 Emergency procedure guide - Transport
	  • AS 1940-2004 Storage and handling of flammable and combustible liquids
	  • AS 3780-2008 The storage and handling of corrosive substances
	  • AS 4332-2004 The storage and handling of gases in cylinders
	  • AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
	• AS/NZS 2243 Set:2006 Safety in laboratories set
	  • AS/NZS 2865 Set:2005 Safe working in a

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RANGE STATEMENT	
	confined space set • AS/NZS 4452:1997 The storage and handling of toxic substances • AS/NZS 4501 Set:2008 Occupational clothing set • AS/NZS ISO 14000 Set:2005 Environmental management standards set • HB 9-1994 Occupational personal protection • animal welfare legislation and codes of practice • Australian code of good manufacturing practice for medicinal products (GMP) • Australian Dangerous Goods Code • Australian Quarantine and Inspection Service (AQIS) Export Control (Orders) Regulations 1982 • Australian Quarantine and Inspection Service (AQIS) Import Guidelines • Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Codes of Practice • data quality procedures • enterprise sampling and monitoring protocols • equipment manuals and warranties, supplier catalogue and handbooks • gene technology regulations • government policy (e.g. sustainable development and impact assessment) • Guide to physical containment levels and facility types • material safety data sheets (MSDS) • national environment protection measures • National Health and Medical Research Council (NHMRC) Guidelines • national measurement regulations and guidelines • occupational health and safety national standards and codes of practice • principles of good laboratory practice (GLP) • site specific requirements • specific environmental standards • Therapeutic Goods Regulations 1009

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RANGE STATEMENT	
Communications	Communications may include: • face-to-face • telephone • written documents • meetings
Purpose of field monitoring activities	Purpose of field monitoring activities may include: • single or multiple site sampling and monitoring • routine monitoring of physical/chemical parameters • biological/ecological surveys • requirement to comply with legislation, regulations or standards • requirement to comply with industry sampling or monitoring protocols or codes of practice
Related plans and procedures	Related plans and procedures may include: • risk assessments • safety and accident/injury plans • emergency plans and procedures, access to nearest medical services • environmental impact assessment procedures • pollution prevention procedures • first aid and survival procedures
Hazards	Hazards may include: • solar radiation, dust and noise • personnel getting lost • accidents, emergencies and incidents, such as snake, insect or animal bites • exposure to severe weather conditions • manual handling of heavy objects • power tools, generators, moving machinery • vehicle and boat handling in rough/remote conditions
Safety procedures and control measures	Safety procedures and control measures may include: • use of personal protective equipment, such as sunscreen, hats, safety glasses, gloves, coveralls and safety boots

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RANGE STATEMENT	
	• 'stay with vehicle' and other survival techniques • regular communication schedule • global positioning system (GPS), maps and aerial photos • handling, storage and disposal of all hazardous materials/waste in accordance with MSDS, labels, enterprise procedures, codes and regulations
Enterprise procedures for field activities	Enterprise procedures for field activities may include: • field note books or log books • standard operating procedures (SOPs) covering fieldwork, sampling and testing • equipment operating manuals, calibration procedures, instrument fault finding procedures and general maintenance and repair procedures • emergency, first aid and survival procedures • field camp procedures for cleaning, cooking, safety, security, hygiene, work management and set up/take down • requirements related to protection of the environment • incident/accident/injury report forms
Administrative requirements and appropriate approvals	Administrative requirements and appropriate approvals may include: • travel requisitions • authority for use of vehicles and equipment • insurance • permits
Equipment	Equipment may include: • navigation and communication equipment (e.g. compass, maps, GPS, two-way radio and mobile phone) • survey equipment • sampling equipment and containers, and animal cages • parameter specific meter or multi-probes (e.g. dissolved oxygen, electrical conductivity, pH, turbidity, nitrates, phosphates and temperature)

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RANGE STATEMENT	
	• field test kits to determine such parameters as dissolved gases, chemical anions and cations, heavy metals, E. coli and biological oxygen demand • portable colourimeters, field microscopes • filters, sieves • soil monitoring kits • data loggers • tools, spares and vehicle recovery equipment • first aid equipment
Pre- and post-field activities	Pre- and post-field activities may include: • review of emergency and safety plans, risk assessment and environmental assessment requirements • confirming information regarding location and contact numbers of nearest emergency services • arranging site access (e.g. maps, permission, keys and condition of tracks) • arranging and checking all transportation systems (e.g. vehicles, boats and aircraft) • checking that communication systems are available and operational • confirming correct and safe use of instruments, equipment and field procedures with supervisor • confirming location and details of sampling sites (e.g. maps, photographs and descriptions) • preparing sample containers (e.g. container type and preparation, preservation techniques and labelling) • arranging correct transport, storage and laboratory testing of samples collected during field activities • arranging additional laboratory testing
Field monitoring activities and skills	Field monitoring activities and skills may include: • sample collection, preservation, labelling, storage, and transportation according to written procedures • correct use and calibration of field instruments according to written instructions • correct and accurate performance of field tests

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RANGE STATEMENT	
	for specific parameters • clear and accurate recording of data • safe operation of motor vehicles and boats
Management of field camp activities	Management of field camp activities may include: • purchase of supplies • booking of accommodation • assembly, checking and transport of equipment/consumables, such as tents, cooking, bedding, communication system, food, water • mechanical checks of all transport vehicles • rostering and supervision of staff • location, establishment, and maintenance of site, including hygiene and waste • removal of waste and site remediation
Site and field issues and problems	Site and field issues and problems may include: • loss or failure of equipment • failure to bring critical equipment • communication failure/difficulties • unexpected restriction access to site • unforseen environmental impacts • contact with hazardous wastes
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

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Unit Sector(s)

Unit sector	Testing

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSL934001A Contribute to the ongoing development of HACCP plans

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to collect and analyse data obtained from hazard analysis and critical control points (HACCP) records. Personnel are required to implement approved corrective actions and complete the review and update of documents and systems related to HACCP plans.

Application of the Unit

Application of the unit	This unit of competency is applicable to technical assistants working in the food processing, manufacturing and pharmaceutical industry sectors. This unit of competency is relevant to experienced technical officers who may work individually or as part of a team. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Review existing HACCP plans	1.1. Collect data and results from HACCP records 1.2. Identify major and minor non-conformances to the HACCP plan 1.3. Monitor critical control points to confirm performance 1.4. Analyse problem areas using appropriate quality improvement tools and techniques 1.5. Suggest corrective actions and strategies to prevent recurrence of the problem 1.6. Document required amendments to the HACCP plan 1.7. Report and present recommendations to appropriate personnel
2. Provide support for	2.1. Analyse roles, duties and current competency of

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ELEMENT	PERFORMANCE CRITERIA
the implementation of HACCP plans	associated personnel in relation to HACCP responsibilities 2.2. Identify training needs and skill development in relation to the successful implementation of the HACCP plan and assist with delivery 2.3. Maintain resource requirements to support HACCP plan
3. Review the implementation plan	3.1. Implement any approved recommendations 3.2. Update any changes to the documents 3.3. Validate the effectiveness of changes to the HACCP plan

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- reviewing existing HACCP plans
- using problem solving techniques to identify causes and options to remedy problems
- assessing risk
- using quality improvement tools and techniques, including statistical process control
- constructing flow diagrams and hazard analysis tables
- delivering training to workplace personnel to assist their understanding of their roles and responsibilities for the implementation of HACCP

Required knowledge

Required knowledge includes:

- products and services provided by the enterprise
- the production process
- layout of the enterprise, divisions and laboratory
- organisational structure of the enterprise
- role of laboratory services to the enterprise and customers
- enterprise procedures associated with the candidate's regular technical duties

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REQUIRED SKILLS AND KNOWLEDGE

• scheduling of tests and procedures to meet customer requirements
• equipment and instrument calibration requirements
• the seven principles of HACCP and relationship to food or pharmaceutical safety
• preliminary steps for HACCP
• benefits of HACCP
• the HACCP plan, including:
  • the critical control points and control limits
  • consequences of non-conforming products being identified
• control charts, control limits and control measures
• flow chart symbols
• critical control points and their potential impact on work systems
• microbiological and chemical safety hazards
• the methods used to monitor each critical, quality, regulatory control point
• methods for systematically investigating and responding to problems
• procedures for addressing non-compliance
• communication channels and consultative arrangements
• continuous improvement practices
• quality policy, procedures and responsibilities
• relevant health, safety and environment requirements

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • obtain necessary data and results • analyse data and identify corrective action • develop a corrective action plan • monitor and evaluate effectiveness of any changes suggested within the context of the ongoing development of HACCP plan • consult and communicate appropriately with associated personnel • recognise major and minor non-conformances

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EVIDENCE GUIDE	
	• construct flow diagrams and hazard analysis tables • deliver training to workplace personnel to assist their understanding of their roles and responsibilities for the implementation of HACCP • document and present recommendations and changes.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with: • *MSL933002A Contribute to the achievement of quality objectives* • *MSL933003A Apply critical control point requirements* • *TAADEL301C Provide training through instruction and demonstration of work skills*. Resources may include: • access to all appropriate documentation, such as HACCP plan and quality manuals.
Method of assessment	The following assessment methods are suggested: • review of documentation completed by the candidate as part of the development of HACCP plans • review of data and reports obtained from HACCP records by the candidate • feedback obtained from managers on implementation and review of HACCP plans. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study

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EVIDENCE GUIDE	
	below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. **Food processing** The milk room at a dairy processing plant was receiving continuing high microbiological counts that were approaching levels where they could affect the safety of the final product. The laboratory supervisor began to collect and analyse information obtained from data production records, laboratory results and corrective action reports. From the information obtained, the technician produced graphs to show the microbiological count over the past few weeks. From this information he/she concluded that the contamination was due to the ineffectiveness of a sanitiser. Recommendations were forwarded to the Quality Review Committee and included a review of the: • quality of the sanitising product and an investigation of alternatives • amount of sanitiser ordered to ensure that it was not being stored beyond its recommended use by date • reliability of the suppliers to provide quality products. Following the Quality Review Committee's agreement, the laboratory technician updated the relevant documents and implemented the recommendations. This resulted in the microbiological counts declining to acceptable levels.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Codes of practice	Where reference is made to industry codes of practice, and/or Australian/international standards,

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RANGE STATEMENT	
	it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australia New Zealand Food Standards (ANZFS) Code • food safety plans and/or pharmaceutical safety requirements • HACCP plans/documents/procedures • principles of good laboratory practice (GLP) • Australian code of good manufacturing practice for medicinal products (GMP) • product safety plan • production/quality procedures/requirements • quality manuals • standard operating procedures (SOPs) • state/territory/national legislation • pharmaceutical standards codes • manufacturers/suppliers specifications • recording sheets • equipment instructions • relevant legislation • equipment operation manuals • standard operating procedures (SOPs) • work instructions • result forms
Software packages	Computer software packages used for the development and implementation of HACCP plans will vary between and within industry sectors
Control points	Control points may be: • critical • quality • regulatory
Products/materials handled by laboratory assistants	Products/materials handled by laboratory assistants may include: • raw materials • ingredients • adjuncts/process aids • consumables

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RANGE STATEMENT	
	• finished product • chemicals • food additives
Members of a HACCP team	Members of a HACCP team may contribute a range of expertise and relevant technical support. They would normally share responsibilities for the development of a HACCP plan
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

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Co-requisite units

Co-requisite units		

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MSL933003A Apply critical control point requirements

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the ability to monitor critical, quality and regulatory control points related to a person's work responsibilities. This unit of competency also covers support for ongoing improvement of the enterprise hazard analysis and critical control points (HACCP) plan.

Application of the Unit

Application of the unit	This unit of competency is applicable to production operators and laboratory assistants in the food processing and manufacturing sectors. Control points refer to those key points in a work process that must be monitored and controlled. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These are found at the end of this unit of competency under the section 'This competency in practice'.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

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Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
1. Provide routine input to the HACCP plan	1.1. Obtain information about control points in the manufacturing process 1.2. Locate control points for own work area responsibilities 1.3. Perform relevant checks and inspections on materials and equipment to establish conformance to meet food safety requirements 1.4. Identify variations or common faults 1.5. Record inspection results and report to appropriate personnel
2. Contribute to the continuous improvement of the HACCP plan	2.1. Recognise non-conformance to the HACCP plan 2.2. Identify likely causes for non-conformance 2.3. Record and report non-conformances to appropriate personnel

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Required Skills and Knowledge

Required skills
Required skills include: • monitoring of the critical, quality and regulatory control points • preventing contamination from occurring or recurring • recording of information using the enterprise reporting system • collecting and analysing data to identify variation from limits • making approved corrective actions as required • supporting continuous improvement through observation and communication
Required knowledge

Required knowledge includes:
• the seven principles of HACCP and relationship to food or pharmaceutical safety
• preliminary steps for HACCP
• benefits of HACCP
• the HACCP plan, including:
  • the critical control points and control limits
  • consequences of non-conforming products being identified
• continuous improvement practices
• quality policy, procedures and responsibilities
• the methods used to monitor each critical, quality, regulatory control point
• equipment and instrument calibration requirements
• methods for systematically investigating and responding to problems
• control points and their potential impact on work systems
• relevant health, safety and environment requirements
• products and services provided by the enterprise
• layout of the enterprise, divisions, and laboratory
• organisational structure of the enterprise
• lines of communication
• role of laboratory services to the enterprise and customers
• scheduling of tests and procedures to meet customer requirements
• enterprise procedures associated with the candidate's regular technical duties

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors should ensure that candidates can: • correctly monitor the critical, quality and regulatory control points for their work • prevent contamination from occurring or recurring • collect, record and interpret data and take corrective actions • support continuous improvement through observation and communication.
Context of and specific resources for assessment	This unit of competency is to be assessed in the workplace or simulated workplace environment. This unit of competency may be assessed with • *MSL922001A Record and present data* • *MSL933002A Contribute to the achievement of quality objectives*. Resources may include: • quality manuals and procedures • HACCP plans and records • recording equipment • case studies to illustrate a range of HACCP issues.
Method of assessment	The following assessment methods are suggested: • observation of the candidate monitoring control points in the work area • feedback from supervisors and peers • review of corrective action suggestions by the candidate • flow charts or diagrams prepared by the candidate, alternatively, the candidate could explain existing charts or diagrams • candidate's response to simulated problems. In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess

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EVIDENCE GUIDE	
	directly. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.
This competency in practice	Industry representatives have provided the case study below to illustrate the practical application of this unit of competency and show its relevance in a workplace setting. **Food processing** The laboratory is responsible for the monitoring of the complex hazard analysis and critical control points in the food production process. The laboratory assistant gathers data at these points for the recording and checking of the process. All data outside the critical limits are immediately communicated to the laboratory manager and the production manager. Any approved corrective actions undertaken by the laboratory assistant are recorded in the laboratory log of system non-conformance. Suggestions for improvement of the system are also recorded for discussion at the regular team meeting.

Range Statement

RANGE STATEMENT
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

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RANGE STATEMENT	
Codes of practice	Where reference is made to industry codes of practice, and Australian/international standards, it is expected the latest version will be used
Standards, **codes**, **procedures and/or enterprise requirements**	Standards, codes, procedures and/or enterprise requirements may include: • Australia New Zealand Food Standards (ANZFS) Code • food safety plans and/or pharmaceutical safety requirements • HACCP plans/documents/procedures • principles of good laboratory practice (GLP) • Australian code of good manufacturing practice for medicinal products (GMP) • product safety plan • production/quality procedures/requirements • quality manuals • standard operating procedures (SOPs) • state/territory/national legislation
Control points	Control points may be: • critical • quality • regulatory
Products/materials handled by laboratory assistants	Products/materials handled by laboratory assistants may include: • raw materials • ingredients • adjuncts/process aids • consumables • finished product • chemicals • food additives
Occupational health and safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time

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RANGE STATEMENT	
	• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Unit Sector(s)

Unit sector	Maintenance

Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAPMSUP301A Apply HACCP to the workplace

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency applies to senior operators working in sectors that make products which come into contact with food and beverages

This competency covers the application of a HACCP-based approach to food and beverage related products.

Acronyms used in this competency:

- CCP - critical control points
- CCF - critical control factors
- CCL - critical control limits
- HACCP - hazard analysis critical control points
- HAT - hazard analysis table.
-

Application of the Unit

Application of this unit

This competency unit covers the development/modification of a HACCP/HAT to the manufacture of products to be used in contact with food, beverages or pharmaceuticals. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the industry where the product comes into contact with food, beverages or pharmaceuticals or otherwise requires 'food standard' to be maintained. Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

It includes:

- applying the 'seven principles' of HACCP
- developing a HAT from a HACCP
- developing a new HACCP as part of a HACCP team
- making changes to existing HACCPs/HATs, resulting from process/material changes (provided such changes are not major requiring a complete new analysis)

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- helping operators to apply and use the HACCP/HAT in their routine work.
-

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	**PERFORMANCE CRITERIA**
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	**PERFORMANCE CRITERIA**
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Apply a HAT to an existing process.	1.1 Identify CCPs. 1.2 Recognise CCFs which are outside of or approaching CCLs. 1.3 Describe hazard related to CCFs and CCLs. 1.4 Implement corrective action as per HAT.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
2. Develop/modify a HACCP.	2.1 Conduct a hazard analysis. 2.2 Determine the CCPs. 2.3 Establish critical limits. 2.4 Establish/modify a system to monitor control of the CCPs. 2.5 Establish the corrective action to be taken when monitoring indicates that a particular CCP is not under control. 2.6 Establish procedures for verification to confirm that the HACCPsystem is working effectively. 2.7 Establish/modify documentation concerning all procedures and records appropriate to these principles and their application.
3. Interpret HACCP/HAT to another worker.	3.1 Explain the purpose and rationale of HACCP. 3.2 Identify CCPs, CCFs and CCLs. 3.3 Describe indicators of CCFs not within their CCLs. 3.4 Describe impact of non-conformances. 3.5 Demonstrate corrective action. 3.6 Monitor worker implement.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Knowledge and understanding of the materials, equipment and process sufficient to recognise HACCP/HAT issues and take appropriate corrective action.

Knowledge of organisation standard procedures, HACCPs and HATs and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and in a manner relevant to the job.

Competence includes knowledge of:

- the HACCP approach
- HAT relevance to routine production
- impacts of variations in materials, process and product on HACCP

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- the relevance of the Codex Alimentarius to food/beverage/pharmaceutical packaging

and the ability to:

- apply the Codex Alimentarius to the food industry
- analyse process and material variations in terms of the HACCPand determine appropriate action(s)
- develop a new HACCP as part of a team
- recognise the need to modify an existing HACCP/HAT and make minor modifications.

Language, **literacy and numeracy requirements**

This unit requires the ability to read, interpret and write technical information and explain it to operators.

Writing is required to the level of writing technical reports and HACCP/HAT tables.

Numeracy is also required, eg to interpret quantitative data, make comparisons and interpretations.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- recognise potential situations requiring action
- implement appropriate action
- understand the procedures
- explain the importance of CCPs, CCFs and CCLs.

Consistent performance should be demonstrated. For example, look to see that HACCP standards are met consistently.

Assessment method and context

Assessment will occur on a processing plant or in a manufacturing environment and will be undertaken in a work-like manner.

Competence in this unit may be assessed:

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- by using an appropriate, industrial plant/process
- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and solve problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This competency covers the development/modification of a HACCP/HAT to the manufacture of products to be used in contact with food, beverages or pharmaceuticals. It assumes an understanding of the operation of all relevant equipment and processes but does not necessarily require them to be used personally.

This competency applies to all work environments and sectors within the process manufacturing industries where the product comes into contact with food, beverages or pharmaceuticals. Standard procedures means all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

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Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards are:

- biological
- chemical
- physical
- product contamination
- material contamination.

Problems

'Anticipate and solve problems' means resolve a wide range of routine and non-routine problems, using product and process knowledge to develop solutions to problems which do not have a known solution/a solution recorded in the procedures.

Typical process and product problems may include:

- recognising CCFs approaching the CCLs.
- determining corrective action from HAT
- applying HACCP principles to situations not directly covered by HAT
- recognising the need for a new/modified HACCP/HAT
- modifying HACCP/HAT to meet changes circumstances.
-

Unit Sector(s)

Not applicable.

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MSAPMOHS401A Assess risk

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

On completion of this unit, the worker will be able to identify hazards and operability problems and then analyse them by hazard analysis techniques to assess risk.

Application of the Unit

Application of this unit

A team with a broad knowledge of the system and its operation will carry out the analysis. It is expected that the risk assessment processes are already defined for the enterprise and that the risk acceptance criteria have already been established. The team will be steered by engineering experts or risk assessment specialists in the industry. This competency applies to workers who, in a typical scenario, take an active role in a HAZOP or similar methodology. They are not expected to lead the HAZOP. This unit is not restricted to HAZOPs and may be applied to other methodologies requiring similar competency. The risk assessment should be consistent with AS 4360 - Risk Management.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has **no** prerequisites.

Employability Skills Information

Employability Skills

This unit contains employability skills.

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Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
1. Identify hazards and potential operability problems.	1.1 Contribute to the compiling of a system description of all the machinery, equipment, operations, products and materials relevant to the everyday working procedures of the facility. 1.2 Contribute to the compiling of a checklist containing process parameters (primary key words) and guide words (secondary key words) relevant to the system. 1.3 Identify hazards, existing control measures and potential operability problems or breakdowns in control measures using the compiled system descriptions and the checklist.
2. Assess impact of risk and determine alternative strategies.	2.1 Screen for causes of deviations and establish consequences. 2.2 Determine alternative strategies for action in relation to each deviation within the range of competency and responsibility. 2.3 Review, clarify and/or analyse risk information to determine its relevance and reliability depending upon the task assigned, level of competency and area of responsibility.
3. Assess risk information against established risk criteria in risk management plan.	3.1 Check risk acceptance criteria for any changes over past period. 3.2 Compare risk information against risk acceptance criteria and procedures to assess acceptability of risk.

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ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance Criteria describe the required performance needed to demonstrate achievement of the Element. Assessment of performance is to be consistent with the Evidence Guide.
	3.3 Conduct liaison with other Internal departments to assess impact on business if applicable. 3.4 Document findings according to company policies and procedures.
4. Develop a risk register.	4.1 Develop a risk assessment chart for each system studied containing deviation, cause, consequence, control measures and action. 4.2 Develop action plan for implementation of control measures, including any changes to procedures. 4.3 Establish or review the procedures by consulting relevant/different work groups. 4.4 Inform relevant work groups of any changes and implement, within area of responsibility, changes in the procedures. 4.5 Monitor effectiveness of the control measures including revised procedures.
5. Establish and maintain procedures for identifying hazards, and assessing and controlling risk.	5.1 Identify and develop procedures for routine hazard identification, assessment and control of risks. 5.2 Address identification of all hazards at the planning, design and evaluation stages of any changes in the workplace to ensure that new hazards are not created by the proposed changes. 5.3 Develop and maintain procedures for selection and implementation of risk control measures in accordance with the hierarchy of control. 5.4 Identify inadequacies in existing risk control measures in accordance with the hierarchy of control and, within area of responsibility, promptly provide resources enabling implementation of new measures.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

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This unit requires the ability to apply a consistent risk assessment methodology which is appropriate to the workplace being assessed. One example of this is the HAZOP methodology, but other methodologies may be used.

Some understanding of quantitative risk assessment, such as HAZAN, is also required.

The requirements of the relevant OHS act and regulations with regard to risk assessment should be known and followed.

Knowledge includes:

- identification of hazards and how hazard controls may break down
- an understanding of risks and how they may be reduced
- the modelling and evaluation of a wide range of failure modes
- analysis which is auditable, repeatable, verifiable and usable by other staff
- analysis systems appropriate to the system operating in the given domain and appropriate for the particular life cycle phase at which it is to be applied
- determining valid results from data of the quality and quantity actually available
- use of standard pro-formas to support the technique
- a rational technical base which may include reference to national or international standards, defence standards or published reference books.

Language, **literacy and numeracy requirements**

This unit requires the ability to interpret process plant descriptions and drawings.

Writing is required to the level of making the required reports for the process.

Numeracy is required to interpret hazard and probability data and determine risk profiles.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Assessment will occur by analysing an appropriate industrial site and will be undertaken in a work-like environment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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- know and understand the workplace systems and the importance of critical procedures
- apply a working knowledge of all relevant workplace procedures.

Consistent performance should be demonstrated. For example, look to see that the techniques used:

- enable identification of hazards and how hazard controls may break down
- enhance the understanding of risks and how it may be reduced
- permit the modelling and evaluation of a wide range of failure modes
- enable the analysis to be carried out in a manner that is auditable, repeatable and verifiable
- are usable by other staff
- are appropriate to the system operating in the given domain
- give valid results from data of the quality and quantity actually available
- are appropriate for the particular lifecycle phase at which it is to be applied
- provide standard pro-formas to support the technique
- have a rational technical basis which may include reference to national or international standards, defence standards or published reference books.

These aspects may be best assessed using a range of scenarios/case studies and 'what ifs' as the stimulus with a walk through forming part of the response. These assessment activities should cover a range of problems, including new, unusual and extreme situations that may have been generated from the past incident history of the plant/equipment, incidents on similar plants around the world, past hazard analysis activities and similar sources.

Assessment method and context

Competence in this unit may be assessed:

- on an appropriate, industrial plant/site
- in a situation allowing the generation of evidence of the ability to respond to problems
- by using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

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Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement

RANGE STATEMENT

The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.

Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Context

This unit will be completed as a specialist unit (eg by plant technicians) requiring technical knowledge.

The aim of this competency unit is to apply a methodical examination of the system and its elements to identify hazards and the states or conditions where there may be loss of control of the hazard and the resultant consequences The results of the hazard analysis should be expressed clearly and concisely, and include where possible tables and diagrams. Team members would contribute their understanding of the process and particularly the operational aspects, and then carry out whatever tasks are assigned to them by the analysis team.

While this competency aims to enable a person to identify hazards and assess risk through a systematic approach, more than 80% of recommendations can be operability problems and are not, of themselves, hazards. Although hazard identification should be the main focus, operability problems should be identified to the extent that they have the potential to lead to a breakdown in hazard controls resulting in a health, safety or environmental violation or have a negative impact on profitability.

The degree of depth of a checklist should be dependent on the knowledge of the system at the time the study is carried out. This technique can therefore be applied at any stage of the project/process lifecycle.

Screening for deviations includes accessing internal and external data that may provide information about previous incidents or warnings of incidents. Sources of such information may include:

- internal hazard and incidents reports, maintenance records, audit reports
- reports from similar plants, factories, industry bodies, regulators, journals etc of actual incidents or reports that have relevance to the situation being analysed.

Examples of risk assessment tools may range from relatively simple to more complex HAZOP analyses and other methodologies requiring similar competency.

Procedures

All operations are performed in accordance with procedures.

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Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards.

Hazards

Typical hazards include:

- handling chemicals and hazardous materials
- chemical and or hazardous materials spillage
- gases and liquids under pressure
- moving machinery
- materials handling
- working at heights, in restricted or confined spaces, or environments subjected to heat, noise, dusts or vapours
- fire and explosion.

Problems

Typical process and product problems may include:

- incidents with a potential for injury
- fires, explosions
- chemical spills
- bomb scares.

Process Parameters

Specific process parameters (primary key words) relevant to the system may include:

- flow
- temperature
- pressure
- relief
- instrumentation
- sampling
- addition
- safety
- reaction
- reduce (grind, crush)
- absorb
- isolate
- vent
- start-up
- composition
- phase
- level
- corrosion
- erosion
- services

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- utilities
- maintenance/maintain
- inserting
- purging
- contamination
- separate (settle, filter, centrifuge)
- mix
- drain
- shutdown.
-

Unit Sector(s)

Not applicable.

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MSACMT483A Support proactive maintenance

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed by a person who leads a production or maintenance team in a proactive maintenance environment.

Application of the Unit

Application of the unit	This unit applies to a team leader in a ***competitive manufacturing*** organisation where proactive maintenance strategies such as Total Productive Maintenance (TPM) or Reliability Centred Maintenance (RCM) are used and the team leader needs to lead the team to take an active role in proactive maintenance. The unit assumes that team members and in particular the team leader are in possession of technical knowledge appropriate to their position about the manufacturing process and equipment and are able to apply this to the maintenance strategy. The unit covers the leading of a team in proactive maintenance activities such as keeping records, visual checks, analysis of failures and effects on production, housekeeping etc. The unit does not cover breakdown maintenance, condition monitoring or non destructive testing. This unit requires the application of skills associated with communication, teamwork, problem solving, initiative, enterprise, planning and organising in order to lead a team in the development and implementation of proactive maintenance strategies. This unit has a strong emphasis on developing and resourcing the team to interpret information and monitor equipment and operation.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Lead team in monitoring process and equipment.	1.1. Demonstrate to team how to observe the process/equipment continuously and critically using appropriate senses (sight, hearing etc) to identify any potential or actual problems 1.2. Identify to team data indicators that must be monitored and recorded 1.3. Ensure team monitors identified data indicators frequently and critically 1.4. Ensure symptoms of operations outside the desired range of conditions and performance are recognised

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ELEMENT	PERFORMANCE CRITERIA
	1.5. Analyse cause of equipment non standard performance within scope of knowledge and skill 1.6. Ensure team members take timely and appropriate action to solve problem or to refer problem to appropriate manager or specialist
2. Apply proactive maintenance strategy.	2.1. Obtain and discuss maintenance strategy with relevant people 2.2. Identify aspects of maintenance strategy which require specific input from team 2.3. Discuss maintenance strategy with team members 2.4. Ensure team members have resources and training to be able to make the required contributions
3. Analyse standard procedures and work practices.	3.1. Examine team procedures and practices for compatibility with maintenance strategy 3.2. Identify areas where production procedures/practices should be changed to comply with maintenance strategy 3.3. Identify areas where maintenance strategy should change to comply with production procedures and practices 3.4. Identify other activities or areas where changes might increase equipment reliability 3.5. Take appropriate action to have the required changes made
4. Facilitate team contribution to proactive maintenance.	4.1. Monitor team's contribution to proactive maintenance 4.2. Arrange for competency development of team members as required 4.3. Facilitate ongoing examination by the team of process reliability and ***overall equipment efficiency*** (***OEE***) 4.4. Arrange for follow through and implementation of team originated improvements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication techniques • negotiation skills • information finding and analysing/using skills • team work • problem solving • planning and organising
Required knowledge:
• understanding of the production process as it applies to the team area of responsibility • understanding of proactive maintenance strategies

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	The assessment should identify that a team leader is able to provide leadership to a team whose responsibilities include the implementation of a proactive maintenance strategy.
What critical aspects of evidence is required to demonstrate competency in this unit?	Evidence of leadership to a team in supporting a proactive maintenance strategy would be required.
In what context should assessment occur?	Assessment needs to occur in an organisation implementing a proactive maintenance strategy preferably through project based assessment.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed concurrently with other leadership related units.
What method of assessment should	Assessors must be satisfied that the person can

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EVIDENCE GUIDE	
apply?	consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	Evidence from one significant change may be sufficient. For less significant changes, a range of changes will be needed to generate sufficient evidence.
What are the specific resource requirements for this unit?	Access to an organisation implementing a proactive maintenance strategy.

Range Statement

RANGE STATEMENT	
The Range Statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording in the Performance Criteria is detailed below. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts.	
Competitive manufacturing	***Competitive manufacturing*** is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing

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RANGE STATEMENT	
	• agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems control and data acquisition software (SCADA), enterprise resource planning systems (ERP), Manufacturing resource planning (MRP), and proprietary systems such as SAP etc. • statistical process control systems including six sigma and three sigma • just in time, kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Team	***Team*** may include work teams from all sections of the organisation including production, maintenance, technical, administration/finance, sales/marketing.
Strategies may include:	Total Productive Maintenance (TPM) Reliability Centred Maintenance (RCM) Root Cause Analysis (RCA) Mean Time Between Failures (MBTF) Failure Mode and Effects Analysis (FMEA) Condition monitoring ***Total Preventative Maintenance***/***Total Productive Maintenance*** (***TPM***) which is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing ***Overall equipment efficiency*** (***OEE***). ***Reliability Centred Maintenance*** (***RCM***) moves maintenance from reactive, or even planned/programmed towards a focus on ***uptime*** and ***OEE***. ***RCA*** There are many possible causes of any problem. Eliminating some will have no impact, others will

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RANGE STATEMENT	
	ameliorate the problem. However elimination of the ***root cause*** will eliminate the problem. There should only be one ***root cause*** for any problem and so the analysis should continue until this one cause is found. Elimination of the ***root cause*** permanently eliminates the problem. ***Uptime*** refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%. ***Overall equipment efficiency*** (***OEE***) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account t losses due to rejects, reworks and start up waste ***Mean time between failure*** (***MBTF***) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether ***root causes*** are being found and resolved. If ***MBTF*** is reducing, then it is an indicator that the maintenance regime is failing. ***Failure Mode and Effects Analysis*** (***FMEA***) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing / assembly operation caused by either design or manufacturing / assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. ***FMEA*** is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of ***FMEA*** and may practice traditional ***FMEA*** in say their routine maintenance while using another technique (such as ***HAZOP***) for design and modification. ***Hazard and Operability Studies*** (***HAZOP***) is a form of ***FMEA*** which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process

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RANGE STATEMENT	
	stability. ***Condition monitoring*** involves often quite sophisticated monitoring of equipment including such things as vibration monitoring, instrumental analysis of lubricating oil etc to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

Functional area

Functional Area	

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MSACMT482A Assist in implementing a proactive maintenance strategy

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills required by a maintenance person to assist in the implementation of a proactive maintenance strategy in a manufacturing environment. This unit includes the interaction between maintenance worker and operator as appropriate.

Application of the Unit

Application of the unit	In a typical scenario, an organisation has adopted/is implementing ***Total Preventative Maintenance***/***Total Productive Maintenance*** (***TPM***), ***Reliability Centred Maintenance*** (***RCM***) or ***similar strategies***. As part of this the maintenance personnel are expected to assist in the implementation by determining appropriate maintenance related schedules and also by providing maintenance related assistance to non-maintenance personnel, such as assisting production personnel to fulfil their role in the TPM/RCM strategy. This unit requires the application of skills associated with problem solving and initiative and enterprise in order to analyse maintenance requirements. Communication, teamwork and planning and organising skills will be required to implement reliability strategies. This requires aspects of self management to ensure improvement of own performance and learning.

Licensing/Regulatory Information

Not applicable.

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Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Develop components of reliability strategy for a work/plant area	1.1. Determine manufacturer's recommended ***inspection***, ***servicing*** and related schedules for relevant plant 1.2. Consult with relevant people with regard to appropriate inspections, services and schedules 1.3. Discuss any conflicts with relevant people and seek resolution of conflicts 1.4. Develop schedules in liaison with relevant people 1.5. Identify inspections and servicing which may be done by operations personnel in liaison with relevant stakeholders
2. Assess current practice for maintenance implications	2.1. Evaluate ***procedures*** for plant/equipment reliability implications 2.2. Discuss current practices with relevant people to determine any plant/equipment reliability

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ELEMENT	PERFORMANCE CRITERIA
	implications 2.3. Recommend changes to improve plant/equipment reliability in accordance with procedures
3. Assist in implementing the reliability strategy	3.1. Arrange for schedules to be incorporated in relevant work plans 3.2. Identify training needs in discussion with relevant personnel 3.3. Assist personnel to develop required skills for inspections/servicing within scope of authority 3.4. Collect data/information as required by own work plan 3.5. Compare data/information with performance indicators 3.6. Recommend improvements to reliability strategy in accordance with procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills:
• communication • planning • organising • prioritising • reading and interpretation • recording • problem solving.
Required knowledge:
• requirements of the proactive maintenance strategy being implemented • principles of operation of the equipment/plant • likely abilities of operations personnel with regard to inspections and servicing • procedures relevant to job • methods of making/recommending improvements.

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Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, required skills and knowledge, the Range Statement and the Assessment Guidelines for this Training Package.	
Overview of assessment requirements	There should be evidence that the maintenance person is routinely applying proactive maintenance strategies in their routine work and that they are aware of why they are important. In a TPM environment, the operator needs to move to taking ownership of their equipment/plant and maintenance personnel have a role to play in helping this happen and in developing the competence of operating personnel to do so
What critical aspects of evidence are required to demonstrate competency in this unit?	Evidence of schedules developed and implemented and improvements recommended.
In what context should assessment occur?	This unit needs to be assessed in a workplace practising, or beginning to implement proactive maintenance.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit could be assessed in conjunction with a technical unit related to maintenance. This unit is related to: • *MSACMT481A Undertake proactive maintenance analyses* which covers the analysis skills associated with proactive maintenance. These units are complimentary and in some organisations it may be appropriate for the one person to hold both competencies. This unit is related to: • *MSACMT681A Develop a proactive maintenance strategy* which is the highest level unit dealing with proactive maintenance in CM.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable,

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EVIDENCE GUIDE	
	authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace. The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	There needs to be evidence that schedules related to proactive maintenance have been developed either in an initial implementation of a proactive maintenance strategy, or have been developed as part of continuous improvement to the proactive maintenance strategy.
What are the specific resource requirements for this unit?	Access to a plant implementing/practising proactive maintenance. No other specific resources are required.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Total Preventative Maintenance/Total Productive Maintenance (**TPM**)	Total Preventative Maintenance/Total Productive Maintenance (TPM) is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing ***Overall Equipment Efficiency*** (***OEE***).
Reliability Centred Maintenance (**RCM**)	Reliability Centred Maintenance (RCM) moves maintenance from reactive, or even planned/programmed, towards a focus on ***uptime*** and

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RANGE STATEMENT	
	OEE.
Similar strategies	***Mean Time Between Failure*** (***MTBF***) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether ***root causes*** are being found and resolved. If MTBF is reducing, then it is an indicator that the maintenance regime is failing. ***Failure Mode and Effects Analysis*** (***FMEA***) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring. Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique (such as ***HAZOP***) for design and modification. ***Hazard and Operability Studies*** (***HAZOP***) is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process stability. ***Condition monitoring*** involves often quite sophisticated monitoring of equipment including such things as vibration monitoring, instrumental analysis of lubricating oil etc to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.
Overall Equipment Efficiency (**OEE**)	Overall Equipment Efficiency (OEE) is the combination of the main factors causing loss of productive capacity from equipment/plant and is: *OEE = availability x performance x quality rate* where: • availability takes into account losses due to breakdown, set up and adjustments • performance takes into account losses due to minor stoppages, reduced speed and idling • quality rate takes into account the losses due to

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RANGE STATEMENT	
	rejects, reworks and start up waste.
Uptime	Uptime refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%.
Inspection	Inspection may include: • reading dials, gauges, meters • observations including those using sight, hearing, smell, feel • observations of product quality/faults/rejects.
Servicing	Servicing may include: • cleaning • lubricating • topping up • adjusting.
Procedures	Procedures include all work instructions, standard operating procedures, formulas/recipes, batch sheets, temporary instructions and similar instructions provided for the smooth running of the plant. They may be written, verbal, computer based or in some other form. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Good Manufacturing Practice (GMP), Responsible Care) and government regulations.

Unit Sector(s)

Unit Sector	CM Tools

corequisite units

Corequisite units	

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Functional area

Functional Area	

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LMFFDT4003A Assess and record the lifecycle of a product

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit specifies the outcomes required to assess and record the design and production of a product from its raw source to its completion and life as a product in accordance with design elements and principles.

Application of the Unit

Application of the unit	This unit supports the attainment of skills and knowledge required for competent workplace performance in furnishing operations of all sizes. Recording of the product lifecycle applies to an industry workplace or design studio environment and involves application of skills and knowledge at a tradesperson equivalent level. These skills and knowledge are to be used within the scope of the individual's job and authority.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Assess raw sources of material	1.1. Applicable ***OHS***, ***legislative*** and ***organisational requirements*** relevant to recording the lifecycle of a product are verified and complied with 1.2. ***Design brief*** is reviewed, confirmed and clarified with ***appropriate personnel*** 1.3. ***Communication*** with others is established and maintained in accordance with OHS requirements 1.4. Most suitable ***materials*** to fulfil the brief are assessed to meet the requirements 1.5. Materials are assessed from their ***source*** taking account of where they derived from and their processing techniques 1.6. Materials are assessed for their ***ecological and environmental impact*** 1.7. Materials are assessed for their availability and supply 1.8. Information on raw materials is recorded for future use
2. Assess the design process	2.1. Problem or underlying factors being addressed by the design brief are verified and ***documented*** 2.2. User needs and desires are assessed and documented 2.3. ***Elements of design*** are assessed for the intended outcome and documented

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ELEMENT	PERFORMANCE CRITERIA
	2.4. ***Principles of design*** are assessed for the intended outcome and documented 2.5. Requirements of the brief are prioritised and assessed for conflicts 2.6. Activities to be undertaken to complete ***concepts***, ***sketches***, ***drawings*** and ***models*** are documented and prioritised 2.7. Final documentation outlining the full analysis of the design brief is compiled and produced as a report
3. Assess the production process	3.1. Production timeline is assessed 3.2. Supply of raw materials for production is analysed 3.3. Available personnel with suitable skills are assessed for proficiency to complete production 3.4. ***Manufacturing process*** is assessed for ***equipment*** and ***assembly methods*** 3.5. ***Component*** production is mapped 3.6. ***Finishing*** requirements are assessed 3.7. Final completion of product is assessed and quality checking arrangements put in place 3.8. Action plan for production is completed
4. Assess the product life	4.1. ***Packaging and despatch*** procedures are assessed and verified 4.2. Destination of the final product is verified and documented 4.3. Use of the product is assessed and potential life of the product estimated 4.4. ***Product lifecycle*** process is reviewed using all of the assessed data

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
• collect, organise and understand information related to work orders, basic plans and safety procedures • communicate ideas and information to enable confirmation of work requirements

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REQUIRED SKILLS AND KNOWLEDGE
and specifications, coordination of work with site supervisor, other workers and customers, and the reporting of work outcomes and problems • work with others and in a team by recognising dependencies and using cooperative approaches to optimise work flow and productivity • recognise and respond to circumstances outside instructions or personal competence • plan and organise activities including the preparation and layout of the worksite and the obtaining of equipment and materials to avoid any back tracking, work flow interruptions or wastage • use mathematical ideas and techniques to correctly complete measurements, calculate area and estimate other material requirements • clarify and confirm work instructions • plan work within given task parameters • accept responsibility for given tasks • set, monitor and satisfy personal work goals • satisfy the competency requirements for the job • accurately recording and maintaining information relating to the furniture making and design functions • maintain current knowledge of techniques and materials used in furniture production • seek learning opportunities.
Required knowledge
• State or Territory OHS legislation, regulations, standards and codes of practice relevant to the full range of processes for assessing and recording furniture details • organisational and site standards, requirements, policies and procedures for assessing and recording furniture details • environmental protection requirements • established communication channels and protocols • problem identification and resolution • elements and principles of design • ergonomics and aesthetic values • characteristics of materials, products and defects • computer programs • procedures for the recording, reporting and maintenance of workplace records and information • appropriate mathematical procedures for estimation and measurement.

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Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	• Effectively record the lifecycle of a product from its raw source to its end use, work through the design process assessing the requirements and recording the intended outcomes • Effectively apply design elements and principles to a product lifecycle • Effectively produce a report on the intended outcomes of a product lifecycle analysis • Comply with legislation, regulations, standards, codes of practice and established safe practices and procedures for recording the lifecycle of a product • Communicate effectively and work safely with others in the work area

Context of and specific resources for assessment	• The application of competency is to be assessed in the workplace or simulated workplace
	• Assessment is to occur under standard and authorised work practices, safety requirements and environmental constraints
	• Assessment of essential underpinning knowledge, other than confirmatory questions, will usually be conducted in an off-site context
	• Assessment is to comply with relevant regulatory or Australian Standards requirements
	• The following resources should be made available:
	  • workplace location or simulated workplace
	  • materials and equipment relevant to recording the lifecycle of a product
	  • specifications and work instructions

Method of assessment	• Assessment must satisfy the endorsed assessment guidelines of the Furnishing Industry Training Package • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge • Assessment methods must be by direct observation of

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EVIDENCE GUIDE	
	tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application • Assessment may be applied under project related conditions (real or simulated) and require evidence of process • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances • Assessment may be in conjunction with assessment of other units of competency
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
OHS requirements	• are to be in accordance with Commonwealth, State or Territory legislation and regulations, organisational safety policies and procedures • requirements may include but not be limited to the use of personal protective equipment and clothing, fire fighting equipment, first aid equipment, hazard and risk control and elimination of hazardous materials and substances, manual handling, including lifting and carrying
Legislative requirements	• are to be in accordance with applicable legislation from all levels of government that affect organisational operation • requirements may include but not be limited to award and enterprise agreements, industrial relations, Australian Standards, confidentiality

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RANGE STATEMENT	
	and privacy, OHS, the environment, equal opportunity, anti-discrimination, relevant industry codes of practice, duty of care and heritage
Organisational requirements	• may include but not be limited to legal, organisational and site guidelines, policies and procedures relating to own role and responsibility, quality assurance, procedural manuals, quality and continuous improvement processes and standards, OHS, emergency and evacuation, ethical standards, recording and reporting, access and equity principles and practices, equipment use, maintenance and storage, environmental management (waste disposal, recycling and re-use guidelines)
Design brief	• is to include the aims, objectives, milestones for the design project, the point of reference for everyone, elements and principles of design and may include organisational or personal profiles, aims, target audience, budget, timeline, consultation requirements, colour requirements, image requirements and function
Appropriate personnel	• may include but not be limited to trainers, supervisors, suppliers, clients, colleagues and managers
Communication	• may include verbal and non-verbal language, constructive feedback, active listening, questioning to clarify and confirm understanding, use of positive, confident and cooperative language, use of language and concepts appropriate to individual social and cultural differences, control of tone of voice and body language
Material	• may include but not be limited to native timber (native and imported), man-made timber products, plastic, metal, alloys, stones, glass, textiles, fibreglass, foam, cardboard, paper products or any other manipulable substance
Sources	• may include but not be limited to the origin of the raw material including, the type and location wood was derived from, how and where it was processed, graph impact growth

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RANGE STATEMENT	
	and available seasoning lead time, the mining source of metal or alloys and how these were processed, the formulas for the composition of plastics, the origin of textiles and how these were milled
Ecological and environmental impact	• may include but not be limited to how the use of raw materials effects the ecology and environment and how its continued use will affect the area it has been sourced from, similarly what impact will be felt by reducing or stopping material from the source
Documentation	• may include but not be limited to working notes, hand written records, typed information and reports
Elements of design	• may include but not be limited to line, shape, form (geometric or organic), texture, colour and function
Principles of design	• may include but not be limited to balance, proportion (symmetry, asymmetry), harmony, contrast, pattern, movement, rhythm, unity, style, focus, scale, dominant, sub dominant or subordinate relationship, emphasis, proximity, alignment, space, anthropometry, ergonomics, arrangement, workload, materials handling capacity, skills, control, equipment capabilities, aesthetic relations, tension and development methods
Concepts	• are to include ideas generated to respond to the design brief through both ideation drawings or sketching and written explanation
Sketches	• may include but not be limited to hand drawn images or ideation drawings completed freehand
Working drawings	• may include but not be limited to drafted technical drawings or drawings produced on computer using computer aided drafting software packages. These usually contain project specifications
Model	• may include any three dimensional product which is made to full size or replicated through maquette. This is usually produced without normal manufacturing techniques, mainly to provide for the analysis of

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RANGE STATEMENT	
	proportion, balance and aesthetic value
Manufacturing process	• may include but not be limited to the methods by which the product will be produced, these steps usually entail working from working drawings and specifications, producing components utilising machine operations, assembly of the components and finishing techniques
Equipment	• may include but not be limited to hand tools, static machinery, portable power tools and computer numerically controlled equipment • is to include procedures for lock out protecting operators and co-workers from accidental injury by isolating the machine from the power source
Assembly methods	• may include but not be limited to nailing, gluing, screwing, welding, pressing, sewing, bonding, jointing or connecting various materials
Components	• may include but not be limited to the parts which make up the whole of a product. Each component is often requires some level of machining to result in the desire part
Finishing	• may include but not be limited to paints, waxes, lacquers, stains, pigments, oils and plastic coatings
Packaging and despatch	• may include but not be limited to wrapping in fabric, plastic wrapping, shrink wrapping, boxing, foam shells and despatch by truck, trailer, train, plane or ship
Product lifecycle	• is the evolution of a product from its raw source, through its inception, development, manufacture, completion and time as a completed product until potential renewal

Unit Sector(s)

Unit sector	Furniture design and technology.

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Competency field

Competency field	

Co-requisite units

Co-requisite units		

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MSAENV472B Implement and monitor environmentally sustainable work practices

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency covers the outcomes required to effectively analyse the workplace in relation to environmentally sustainable work practices and to implement improvements and monitor their effectiveness. This unit is based on the sustainability guideline standard GCSSUS02A Implement and monitor environmentally sustainable work practices.

Application of the Unit

Application of the unit	This competency applies to those who have responsibility for a specific area of work or who lead a work group or team. It addresses the knowledge, processes and techniques necessary to implement and monitor environmentally sustainable work practices, including the development of processes and tools. It includes: • Identifying areas for improvement • Developing plans to make improvements • Implementing and monitoring improvements in environmental performance. This competency applies to all sectors of the manufacturing industry and members of its value chain. It may also be applied to all sections of an organisation, including office, warehouse etc. This unit will need to be appropriately contextualised as it is applied across an organisation and across different industry sectors.

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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	This unit has **no** prerequisites	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Investigate current practices in relation to resource usage.	1.1 Identify environmental regulations applying to the enterprise. 1.2 Assess procedures for assessing ***compliance*** with environmental regulations. 1.3 Collect information on environmental and resource efficiency systems and procedures, and provide to the work group where appropriate. 1.4 Measure and record current resource usage by members of the work group.

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ELEMENT	PERFORMANCE CRITERIA
	1.5 Analyse and record current purchasing strategies. 1.6 Analyse current work processes to access information and data and assist in identifying areas for improvement.
2. Set targets for improvements.	2.1 Seek input from stakeholders, key personnel and specialists. 2.2 Access external sources of information and data as required. 2.3 Evaluate alternative solutions to workplace environmental issues. 2.4 Set efficiency targets.
3. Implement performance improvement strategies.	3.1 Source ***techniques***/***tools*** to assist in achieving targets. 3.2 Apply continuous improvement strategies to own work area of responsibility and communicate ideas and possible solutions to the work group and management. 3.3 Integrate environmental and resource efficiency improvement plans for own work group with other operational activities and implement them. 3.4 Seek suggestions and ideas about environmental and resource efficiency management from stakeholders and act upon them where appropriate. 3.5 Implement costing strategies to fully value environmental assets.
4. Monitor performance.	4.1 Document outcomes and communicate reports on targets to key personnel and stakeholders. 4.2 Evaluate strategies. 4.3 Set new targets and investigate and apply new tools and strategies. 4.4 Promote successful strategies and reward participants where possible.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Required skills include:

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REQUIRED SKILLS AND KNOWLEDGE
• using relevant environmental and resource efficiency systems, tools and procedures • applying quality assurance systems relevant to own work area • applying relevant supply chain procedures • measurement and calculation techniques • communication/consultation skills to ensure information is supplied to the work group Reading and writing is required to comprehend documentation and interpret environmental and energy efficiency requirements and to document and maintain records Numeracy is required to interpret numeric workplace information, readings and measurements, handle data as required and complete numeric components of workplace forms/reports.
Required knowledge
Required knowledge includes: • how to access and use relevant environmental and resource efficiency systems, tools and procedures • understanding of best practice approaches relevant to own area of responsibility • strategies to maximise opportunities and minimise impacts relevant to own work area • relevant environmental and resource efficiency issues specific to industry practices • methods for measuring and calculating resource usage

Evidence Guide

EVIDENCE GUIDE	
The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competence in this unit must be able to provide evidence of the ability to implement and monitor integrated environmental and resource efficiency management policies and procedures within an organisation.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

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EVIDENCE GUIDE	
	• monitor and investigate current resource usage • develop plans to improve sustainability • implement environmental improvements. Consistent performance should be demonstrated. For example, look to see that: • environmental performance is routinely monitored and investigated • areas for improvements are followed through and the implemented changes are in turn monitored and investigated.
Context of and specific resources for assessment	This section should be read in conjunction with the range of variables for this unit of competency. Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed: • by demonstration in the workplace • using targeted questioning for appropriate portions • through use of specific project(s) • by use of a suitable simulation and/or a range of case studies/scenarios • by a combination of these techniques. In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or

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EVIDENCE GUIDE	
	similar assessment.
Guidance information for assessment	Assessors need to be aware of any cultural issues that may affect responses to questions. Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Procedures	All operations are performed in accordance with procedures. Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.

Environmental and resource efficiency issues	Environmental and resource efficiency issues include:
	• addressing environmental and resource sustainability initiatives such as Environmental Management Systems, action plans, surveys and audits
	• reference to standards, guidelines and approaches such as:
	  • ISO 14001 Environmental Management Systems
	  • Life Cycle Analyses

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RANGE STATEMENT	
	• Cradle to cradle • Global Reporting Initiative • Ecological footprinting • Triple Bottom Line reporting • Product Stewardship • determining enterprise's most appropriate waste treatment including waste to landfill, recycling, re-use and wastewater treatment • applying the waste management hierarchy in the workplace • initiating and/or maintaining appropriate enterprise procedures for operational energy consumption, including stationary energy and non stationary (transport) • efficient use of water • minimising greenhouse gas emissions • use of controls to minimise the risk of environmental damage from hazardous substances
Measure	Measuring techniques include: • material fed to/consumed by plant/equipment • plant meters and gauges • job cards including kanbans • examination of invoices from suppliers • measurements made under different conditions • examination of relevant information and data • others as appropriate to the specific industry contexts.
Techniques and tools	Techniques and tools may includeÂ : • visual workplace concepts • measurement, display and/or recording devices • changed work practices/procedures • competence development and awareness training • process and equipment items
Compliance	Compliance includes meeting relevant federal, state and local government laws, by-laws, regulations and codes of practice.
Incidents	Incidents include:

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RANGE STATEMENT	
	• breaches or potential breaches of regulations • occurrences outside of standard procedure which may lead to lower environmental performance
Purchasing strategies	Purchasing strategies include: • influencing suppliers to take up environmental sustainability • selecting materials/components with a lower environmental profile.
Stakeholders, **key personnel and specialists**	Stakeholders, key personnel and specialists include individuals and groups both inside and outside the organisation that have some direct interest in the enterprise's conduct, actions, products and services, including: • employees at all levels of the organisation • customers • suppliers • other organisations • key personnel within the organisation, and specialists outside it who may have particular technical expertise
Suggestions	Suggestions includes ideas that help to: • prevent and minimise environmental risks and maximise opportunities • reduce emissions of greenhouse gases • reduce use of non-renewable resources • make more efficient use of energy, water and other resources • maximise opportunities to re use and recycle materials • identify strategies to offset or mitigate environmental impacts. e.g. purchasing of carbon credits • express purchasing power through the selection of suppliers with improved environmental performance. e.g. purchasing renewable energy and materials with lower embedded carbon • eliminate the use of hazardous and toxic materials increasing the reusability/recyclability of wastes/products.

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Unit Sector(s)

Unit sector	

Competency field

Competency field	Competitive manufacturing tools

Co-requisite units

Co-requisite units		

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