MEM30105 Certificate III in Engineering - Production Systems

Modification History

Release 8 - Imported elective unit AURV225908A replaced by AURVTN2002. No change in outcomes.
Release 7 - equivalent. Inclusion of three new die correction electives.

Description

This qualification covers the skills and knowledge required of workers employed as Engineering/Manufacturing Employees - Level V as defined in the Manufacturing and Associated Industries and Occupations Award or in related industries where Engineering/Manufacturing Employees work.

The qualification has been specifically developed to reflect the minimum training requirement specified in the Award for employment in the above occupation. 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 such as those delivered through a formal traineeship. The qualification may also be achieved through formal skills recognition assessment processes.

Application
This qualification is designed to provide an industry recognised skills profile related to production work as an Engineering/ Manufacturing Employee - Level V. Competency development would typically be undertaken through an Australian Apprenticeships arrangement where the integration of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and trainee.

Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and/or materials to cover the scope of application of those units. All outcomes must reflect the standard of performance required of the work associates with the Unit/s.

This qualification is not suited and should not be used for people who are not employed in an engineering production or manufacturing environment. It is not suited and should not be used for school students unless they are formally engaged in a traineeship in accordance with the Australian Apprenticeships policy.

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common engineering terminology • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Use diagnostic skills and tests to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including process, quality, environmental compliance and improvement, and internal/external customer/supplier relationships • Economise material use and minimise waste

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Planning and organising	• Plan, prioritise and sequence work operations/complete activities/ scheduled production • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common engineering terminology • Liaise with appropriate authorities
Technology	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others

Packaging Rules

The minimum requirements for achievement of the Certificate III in Engineering - Production Systems are:

- completion of all core units of competency listed below, and
- completion of Group A production stream units from the list below to the value of at least 40 points, and
- completion of Group B specialisation units from the list below to bring the total value of elective units to at least 73 points.

Points associated with prerequisites count towards the total (refer to units for details). Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the NSSC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Additional qualification descriptors
The following additional descriptors are approved for use with this qualification: Surface Finishing; Marine Craft Surface Finishing.

Core Units

- select all of the units from this list

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective Units

Group A - Production stream units

- select units from this list to the value of at least 40 points

Unit code	**Unit title**	**P**
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly	4
MEM03003B	Perform sheet and plate assembly	4
MEM03004B	Perform electronic/electrical assembly (production)	8
MEM03005B	Rework and repair (electrical/electronic production)	8
MEM03006B	Set assembly stations	2
MEM04001B	Operate melting furnaces	4
MEM04002B	Perform gravity die casting	2
MEM04003B	Operate pressure die casting machine	4
MEM04004B	Prepare and mix sand for metal moulding	4
MEM04006B	Operate sand moulding and core making machines	8
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4
MEM05003B	Perform soft soldering	2
MEM05027A	Perform aluminothermic welding	2
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6

Unit code	Unit title	P
MEM06006C	Repair springs	4
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8
MEM07024B	Operate and monitor machine/process	4
MEM07025B	Perform advanced machine/process operation	6
MEM07026B	Perform advanced plastic processing	6
MEM07027B	Perform advanced press operations	6
MEM07028B	Operate computer controlled machines/processes	2
MEM07042A	Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems	4
MEM07043A	Identify causes of faulty aluminium extrusions	6
MEM07044A	Test a new aluminium extrusion die	4
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2
MEM08007B	Control surface finish production and finished product quality	4

Unit code	Unit title	P
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6
MEM08019B	Electroplate protective finishes	6
MEM08020B	Electroplate decorative finishes	6
MEM09002B	Interpret technical drawing	4
MEM11001C	Erect/dismantle scaffolding and equipment	4
MEM11002C	Erect/dismantle complex scaffolding and equipment	4
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	4
MEM11004B	Undertake dogging	4
MEM11005B	Pick and process order	4
MEM11006B	Perform production packaging	2

Unit code	Unit title	P
MEM11007B	Administer inventory procedures	4
MEM11008B	Package materials (stores and warehouse)	2
MEM11009B	Handle/move bulk fluids/gases	4
MEM11010B	Operate mobile load shifting equipment	4
MEM11011B	Undertake manual handling	2
MEM11012B	Purchase materials	6
MEM11013B	Undertake warehouse receival process	4
MEM11014B	Undertake warehouse dispatch process	4
MEM11015B	Manage warehouse inventory system	6
MEM11016B	Order materials	2
MEM11017B	Organise and lead stocktakes	4
MEM11018B	Organise and maintain warehouse stock receival and/or dispatch system	6
MEM11019B	Undertake tool store procedures	4
MEM11020B	Perform advanced warehouse computer operations	4
MEM11021B	Perform advanced operation of load shifting equipment	2
MEM11022B	Operate fixed/moveable load shifting equipment	4
MEM11023A	Operate a bridge and gantry crane	4
MEM11024A	Undertake basic rigging*	4
MEM11025A	Operate a non-slewing mobile crane of greater than three tonnes capacity	4
MEM12001B	Use comparison and basic measuring devices	2

Unit code	Unit title	P
MEM12002B	Perform electrical/electronic measurement	2
MEM12019B	Measure components using coordinate measuring machine	4
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM15001B	Perform basic statistical quality control	2
MEM15003B	Use improvement processes in team activities	4
MEM15004B	Perform inspection	2
MEM15005B	Select and control inspection processes and procedures	4
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18098A	Prepare to perform work associated with fuel system installation and servicing*	2
MEM26001A	Lay up composites using open moulding techniques	6
MEM26002A	Lay up composites using vacuum closed moulding techniques	6
MEM26003A	Lay up composites using pressure closed moulding techniques	6
MEM26004A	Make basic plugs for composites fabrication	3
MEM26005A	Make basic moulds for composites fabrication	3
MEM26006A	Mark and cut out sheets for composite use	4
MEM26007A	Select and use reinforcing appropriate for product	4

Unit code	Unit title	P
MEM26008A	Select and use resin systems appropriate for product	4
MEM26009A	Select and use cores and fillers appropriate for product	2
MEM26010A	Store and handle composite materials	2
MEM26011A	Determine materials and techniques for a composite component or product*	6
MEM26012A	Record and trial work processes for one-off composite products	4
MEM26013A	Select and use composite processes or systems appropriate for product	4
MEM26014A	Adjust resin chemicals for current conditions	4
MEM26015A	Select and apply repair techniques	6
MEM26016A	Select and use joining techniques	6
MEM26017A	Prepare composite or other substrate surfaces	4
MEM26018A	Organise composite trials	4
MEM26019A	Finish a composite product	4
MEM26020A	Identify and interpret required standards for composites	2
CPCCLDG3001A	Licence to perform dogging	0
CPCCLRG3001A	Licence to perform rigging basic level	0
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	0
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	0
TLILIC0012A	Licence to operate a vehicle loading crane	1

Unit code	Unit title	P
	(capacity 10 metre tonnes and above)	
TLILIC2001A	Licence to operate a forklift truck	0
TLILIC2002A	Licence to operate an order picking forklift truck	0
TLILIC3003A	Licence to operate a bridge and gantry crane	0
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than three tonnes capacity)	0

Group B - Specialisation units

- select units from this list to bring the total value of Production stream and Specialisation units to at least 73 points, including any prerequisites.

Unit code	Unit title	P
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly	4
MEM03003B	Perform sheet and plate assembly	4
MEM03004B	Perform electronic/electrical assembly (production)	8
MEM03005B	Rework and repair (electrical/electronic production)	8
MEM03006B	Set assembly stations	2
MEM04001B	Operate melting furnaces	4
MEM04002B	Perform gravity die casting	2
MEM04003B	Operate pressure die casting machine	4
MEM04004B	Prepare and mix sand for metal moulding	4
MEM04005C	Produce moulds and cores by hand (jobbing)	16
MEM04006B	Operate sand moulding and core making machines	8
MEM04007B	Pour molten metal	4

Unit code	Unit title	P
MEM04008B	Fettle and trim metal castings/forgings	4
MEM04010B	Develop and manufacture wood patterns	20
MEM04011B	Produce polymer patterns	8
MEM04012B	Assemble plated patterns	8
MEM04013B	Develop and manufacture polystyrene patterns	2
MEM04014B	Develop and manufacture production patterns	8
MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment	6
MEM04018B	Perform general woodworking machine operations	4
MEM04019B	Perform refractory installation and repair	4
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4
MEM05003B	Perform soft soldering	2
MEM05004C	Perform routine oxy acetylene welding	2
MEM05005B	Carry out mechanical cutting	2
MEM05006C	Perform brazing and/or silver soldering	2
MEM05007C	Perform manual heating and thermal cutting	2
MEM05009C	Perform automated thermal cutting	2
MEM05011D	Assemble fabricated components	8
MEM05012C	Perform routine manual metal arc welding	2
MEM05013C	Perform manual production welding	2
MEM05014C	Monitor quality of production welding/fabrications	2

Unit code	Unit title	P
MEM05015D	Weld using manual metal arc welding process	4
MEM05017D	Weld using gas metal arc welding process	4
MEM05019D	Weld using gas tungsten arc welding process	4
MEM05023C	Weld using submerged arc welding process	4
MEM05041B	Weld using powder flame spraying	4
MEM05047B	Weld using flux core arc welding process	4
MEM05049B	Perform routine gas tungsten arc welding	2
MEM05050B	Perform routine gas metal arc welding	2
MEM05051A	Select welding processes	2
MEM05052A	Apply safe welding practices	4
MEM05053A	Set and edit computer controlled thermal cutting machines	4
MEM05054A	Write basic NC/CNC programs for thermal cutting machines	4
MEM06001B	Perform hand forging	4
MEM06002B	Perform hammer forging	4
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6
MEM06005B	Perform drop and upset forging	4
MEM06006C	Repair springs	4
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM06008A	Hammer forge complex shapes	4
MEM06009A	Hand forge complex shapes	4

Unit code	Unit title	P
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07002B	Perform precision shaping/planing/slotting operations	4
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8
MEM07005C	Perform general machining	8
MEM07010B	Perform tool and cutter grinding operations	4
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines	4
MEM07014B	Perform electro-discharge (EDM) machining operations	4
MEM07015B	Set computer controlled machines/processes	2
MEM07016C	Set and edit computer controlled machines/processes	4
MEM07018C	Write basic NC/CNC programs	4
MEM07019C	Program NC/CNC machining centre	2
MEM07022C	Program CNC wire cut machines	2
MEM07024B	Operate and monitor machine/process	4
MEM07025B	Perform advanced machine/process operation	6
MEM07026B	Perform advanced plastic processing	6
MEM07027B	Perform advanced press operations	6
MEM07028B	Operate computer controlled machines/processes	2
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters	4
MEM07030C	Perform metal spinning lathe operations (basic)	8
MEM07031C	Perform metal spinning lathe operations (complex)	4

Unit code	Unit title	P
MEM07032B	Use workshop machines for basic operations	2
MEM07033B	Operate and monitor basic boiler	6
MEM07034A	Operate and monitor intermediate class boiler	4
MEM07040A	Set multistage integrated processes	6
MEM07041A	Perform production machining*	8
MEM07042A	Undertake corrections and basic maintenance to aluminium extrusion dies and die support systems	4
MEM07043A	Identify causes of faulty aluminium extrusions	6
MEM07044A	Test a new aluminium extrusion die	4
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2
MEM08007B	Control surface finish production and finished product quality	4
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4

Unit code	Unit title	P
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6
MEM08019B	Electroplate protective finishes	6
MEM08020B	Electroplate decorative finishes	6
MEM09002B	Interpret technical drawing	4
MEM09011B	Apply basic engineering design concepts	6
MEM09022A	Create 2D code files using computer aided manufacturing system	4
MEM10002B	Terminate and connect electrical wiring	3
MEM10004B	Enter and change programmable controller operational parameters	2
MEM10011B	Terminate and connect specialist cables	3
MEM10013A	Install split air conditioning systems and associated pipework	6
MEM11001C	Erect/dismantle scaffolding and equipment	4
MEM11002C	Erect/dismantle complex scaffolding and equipment	4
MEM11003B	Coordinate erection/dismantling of complex scaffolding/equipment	4
MEM11004B	Undertake dogging	4
MEM11005B	Pick and process order	4
MEM11006B	Perform production packaging	2

Unit code	Unit title	P
MEM11007B	Administer inventory procedures	4
MEM11008B	Package materials (stores and warehouse)	2
MEM11009B	Handle/move bulk fluids/gases	4
MEM11010B	Operate mobile load shifting equipment	4
MEM11011B	Undertake manual handling	2
MEM11012B	Purchase materials	6
MEM11013B	Undertake warehouse receival process	4
MEM11014B	Undertake warehouse dispatch process	4
MEM11015B	Manage warehouse inventory system	6
MEM11016B	Order materials	2
MEM11017B	Organise and lead stocktakes	4
MEM11018B	Organise and maintain warehouse stock receival and/or dispatch system	6
MEM11019B	Undertake tool store procedures	4
MEM11020B	Perform advanced warehouse computer operations	4
MEM11021B	Perform advanced operation of load shifting equipment	2
MEM11022B	Operate fixed/moveable load shifting equipment	4
MEM12001B	Use comparison and basic measuring devices	2
MEM12002B	Perform electrical/electronic measurement	2
MEM11023A	Operate a bridge and gantry crane	4
MEM11024A	Undertake basic rigging*	4
MEM11025A	Operate a non-slewing mobile crane of greater than three tonnes capacity	4

Unit code	Unit title	P
MEM12003B	Perform precision mechanical measurement	2
MEM12004B	Perform precision electrical/electronic measurement	4
MEM12019B	Measure components using coordinate measuring machine	4
MEM12020B	Set and operate coordinate measuring machine	2
MEM12025A	Use graphical techniques and perform simple statistical computations	2
MEM13001B	Perform emergency first aid	1
MEM13002B	Undertake occupational health and safety activities in the workplace	3
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM13006B	Collect and evaluate occupational health and safety data for an enterprise or section of an enterprise	4
MEM13010A	Supervise occupational health and safety in an industrial work environment	4
MEM13013B	Work safely with ionizing radiation	4
MEM15001B	Perform basic statistical quality control	2
MEM15003B	Use improvement processes in team activities	4
MEM15004B	Perform inspection	2
MEM15005B	Select and control inspection processes and procedures	4
MEM16002C	Conduct formal interviews and negotiations	4
MEM16004B	Perform internal/external customer service	2
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	2

Unit code	Unit title	P
MEM16011A	Communicate with individuals and small groups	2
MEM16013A	Operate in a self-directed team	2
MEM17001B	Assist in development and deliver training in the workplace	2
MEM17002B	Conduct workplace assessment	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work	4
MEM18010C	Perform equipment condition monitoring and recording	4
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	4
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3
MEM18055B	Dismantle, replace and assemble engineering components	3
MEM18063B	Terminate signal and data cables	4
MEM18071B	Connect/disconnect fluid conveying system components	2
MEM18072B	Manufacture fluid conveying conductor assemblies	4
MEM18084A	Commission and decommission split air conditioning systems	4
MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances	6
MEM18086B	Test, recover, evacuate and charge refrigeration systems	4
MEM18098A	Prepare to perform work associated with fuel system installation and servicing*	2
MEM19001B	Perform jewellery metal casting	6

Unit code	Unit title	P
MEM19002B	Prepare jewellery illustrations	4
MEM19003B	Handle gem materials	2
MEM19004B	Handle and examine gemstone materials	6
MEM19005B	Produce three-dimensional precision items	8
MEM19006B	Replace watch batteries	1
MEM19007B	Perform gemstone setting	6
MEM19009B	Perform investment procedures for lost wax casting process	1
MEM19010B	Produce rubber moulds for lost wax casting process	2
MEM19011B	Perform wax injection of moulds for lost wax casting process	2
MEM19012B	Produce jewellery wax model	4
MEM19014B	Perform hand engraving	4
MEM19015B	Perform jewellery enamelling	4
MEM19016B	Construct jewellery components	4
MEM19017B	Fabricate jewellery items	6
MEM19020B	Fault-find and maintain micro-mechanisms	4
MEM19021B	Diagnose and service micro-mechanisms	6
MEM20001A	Produce keys	4
MEM20002A	Assemble and test lock mechanisms	6
MEM20003A	Install and upgrade locks and hardware	4
MEM20004A	Gain entry	4
MEM20006A	Maintain and service mechanical locking devices	6
MEM20014A	Perform a site security survey	2

Unit code	Unit title	P
MEM24001B	Perform basic penetrant testing	2
MEM24002B	Perform penetrant testing	4
MEM24003B	Perform basic magnetic particle testing	2
MEM25001B	Apply fibre-reinforced materials	2
MEM25002B	Form and integrate fibre-reinforced structures	4
MEM25003B	Set up marine vessel structures	4
MEM25004B	Fair and shape surfaces	2
MEM25005B	Construct and assemble marine vessel timber components	8
MEM25006B	Undertake marine sheathing operations	2
MEM25007B	Maintain marine vessel surfaces	4
MEM25008B	Repair marine vessel surfaces and structures	4
MEM25009B	Form timber shapes using hot processes	2
MEM25010B	Perform fitout procedures	4
MEM25011B	Install marine systems	8
MEM25012B	Install and test operations of marine auxiliary systems	6
MEM25013B	Produce three-dimensional plugs/moulds	12
MEM25014B	Perform marine slipping operations	2
MEM25015A	Assemble and install equipment and accessories/ancillaries	2
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment	4
MEM50002B	Work safely on marine craft	1
MEM50003B	Follow work procedures to maintain the marine environment	1

Unit code	Unit title	P
MEM50004B	Maintain quality of environment by following marina codes	1
MEM50009B	Safely operate a mechanically powered recreational boat	2
MSAENV472B	Participate in environmentally sustainable work practices	4
AURVTN2002	Carry out panel repairs	4
CPCCLDG3001A	Licence to perform dogging	0
CPCCLRG3001A	Licence to perform rigging basic level	0
CPCCLSF2001A	Licence to erect, alter and dismantle scaffolding basic level	0
CPCCLSF3001A	Licence to erect, alter and dismantle scaffolding intermediate level	0
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)	1
TLILIC2001A	Licence to operate a forklift truck	0
TLILIC2002A	Licence to operate an order picking forklift truck	0
TLILIC3003A	Licence to operate a bridge and gantry crane	0
TLILIC3006A	Licence to operate a non-slewing mobile crane (greater than three tonnes capacity)	0
PMBPROD291B	Operate resin infusion moulding equipment	2
PMBPROD294B	Operate resin transfer moulding equipment	2
PMBPROD298B	Operate equipment using pre-pregs material	2
PMBPROD391B	Produce composites using resin infusion	4
PMBPROD394B	Produce composites using resin transfer moulding	4
PMBPROD398B	Produce composites using pre-pregs	4

MEM30205 Certificate III in Engineering - Mechanical Trade

Modification History

ISC upgrade to include new units in Trade Specialisation list. Refer to Mapping of Changes.

Description

This qualification covers the skills and knowledge required to work as an Engineering Tradesperson - Mechanical within metal, engineering, manufacturing and associated industries or other industries where Engineering Tradesperson - Mechanical work. The qualification has been specifically developed for apprentices in the above trade. 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 such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles/employment outcome
The Certificate III in Engineering - Mechanical Trade specifies the competencies required for employment as an Engineering Tradesperson - Mechanical including the design, assembly, manufacture, installation, modification, testing, fault finding, commissioning, maintenance and service of all mechanical equipment, machinery, fluid power systems, stationary and mobile equipment, instruments, refrigeration, and the use of computer controlled machine tools.
Employment outcomes related to this qualification are found in a wide variety of manufacturing and engineering related sectors as well as Engineering Tradesperson - Mechanical roles in other industries.

Application
This qualification is designed to provide an industry recognised skills profile related to trade work as an Engineering Tradesperson - Mechanical. Skills development would be undertaken through an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.
Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.
Occupational titles that this qualification is suitable for may vary and include mechanical tradesperson, fitter and turner, fitter and machinist, maintenance fitter, diesel fitter, plant mechanic, refrigeration mechanic and 1st class machinist.

Pathways Information

Pathways into the qualification
There is no qualification entry requirement. It is assumed that the learner is engaged as an apprentice under a Training Contract and that the learner is receiving appropriate structured on-the-job training while undertaking this qualification.

This qualification may be accessed by direct entry. Credit may be granted towards this qualification by those who have completed MEM10105 Certificate I in Engineering, MEM10205 Certificate I in Boating Services, MEM20105 Certificate II in Engineering, MEM20205 Certificate II in Engineering - Production Technology or other relevant qualifications. Credit towards this qualification may also include units of competency contained within relevant skill sets and Statements of Attainment.

Pathways from the qualification
Further training pathways from this qualification include MEM40105 Certificate IV in Engineering and MEM50105 Diploma of Engineering - Advanced Trade or other relevant qualifications.

Additional qualification advice
An additional descriptor may be added to this qualification to illustrate a particular skills focus or trade discipline.
This could be achieved by adding a pathway descriptor or sentence *below* the formal title of the qualification. Note that no changes may be made to the qualification title and the use of one of these descriptors to a qualification does not change the qualification's formal title or unique national code.
There are no specific requirements associated with the use of these descriptors other than their use should reflect the nature of the choice of units of competency in the qualification and must be consistent with the work role of an Engineering Tradesperson - Mechanical.
Reference to other occupational or functional pathways consistent with the role of an Engineering Tradesperson - Mechanical may be included on any qualification statement that is issued.
Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing considerations
There are no specific licences that relate to this qualification. However, some units in this qualification may relate to licensing or regulatory requirements. Where appropriate electives are taken these can also be used to satisfy regulations regarding refrigeration and air conditioning work. Local regulations should be checked for details.

Licensing/Regulatory Information

Refer to Pathways Information

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common mechanical engineering terminology and symbols • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Use diagnostic skills and tests to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes • Develop, implement and evaluate solutions to problems • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Economise material and energy use and minimise waste
Planning and organising	• Plan, prioritise and sequence work operations/ complete activities/ scheduled production • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, diagnostic methods, tools and equipment to achieve the required outcome • Calibrate equipment/instruments • Improve efficiency of machines and equipment in order to

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	minimise waste

Packaging Rules

Packaging Rules
The minimum requirements for achievement of the Certificate III in Engineering - Mechanical Trade are:

- completion of all core units of competency listed below, and
- completion of Group A Mechanical Trade stream units to the value of at least 40 points, and
- completion of units from Group B Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Mechanical Trade occupational outcomes.

Additional qualification descriptors
The following additional descriptors are approved for use with this qualification: Refrigeration and Air Conditioning; Instrumentation; Maintenance; Patternmaking; Toolmaking; Watchmaking; Machining.

Core units

- select all of the units from this list

Unit code	Unit title
MEM12023A	Perform engineering measurements

Unit code	Unit title
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective Units

Group A - Mechanical Trade stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07002B	Perform precision shaping/planing/slotting operations	4
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8

Unit code	Unit title	P
MEM07005C	Perform general machining	8
MEM07006C	Perform lathe operations	4
MEM07007C	Perform milling operations	4
MEM07008D	Perform grinding operations	4
MEM07009B	Perform precision jig boring operations	4
MEM07010B	Perform tool and cutter grinding operations	4
MEM07011B	Perform complex milling operations	4
MEM07012B	Perform complex grinding operations	4
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines	4
MEM07014B	Perform electro-discharge (EDM) machining operations	4
MEM07015B	Set computer controlled machines/processes	2
MEM07016C	Set and edit computer controlled machines/processes	4
MEM07018C	Write basic NC/CNC programs	4
MEM07019C	Program NC/CNC machining centre	2
MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre	2
MEM07021B	Perform complex lathe operations	4

Unit code	Unit title	P
MEM07022C	Program CNC wire cut machines	2
MEM07023C	Program and set up CNC manufacturing cell	6
MEM07024B	Operate and monitor machine/process	4
MEM07025B	Perform advanced machine/process operation	6
MEM07026B	Perform advanced plastic processing	6
MEM07027B	Perform advanced press operations	6
MEM07028B	Operate computer controlled machines/processes	2
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters	4
MEM07030C	Perform metal spinning lathe operations (basic)	8
MEM07031C	Perform metal spinning lathe operations (complex)	4
MEM07032B	Use workshop machines for basic operations	2
MEM07033B	Operate and monitor basic boiler	6
MEM07034A	Operate and monitor intermediate class boiler	4
MEM07040A	Set multistage integrated processes	6
MEM09002B	Interpret technical drawing	4
MEM09022A	Create 2D code files using computer aided manufacturing system	4

Unit code	Unit title	P
MEM10004B	Enter and change programmable controller operational parameters	2
MEM10006B	Install machine/plant	4
MEM12003B	Perform precision mechanical measurement	2
MEM12006C	Mark off/out (general engineering)	4
MEM13007B	Maintain water treatment systems for cooling towers	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work	4
MEM18004B	Maintain and overhaul mechanical equipment	4
MEM18005B	Perform fault diagnosis, installation and removal of bearings	4
MEM18006C	Repair and fit engineering components	6
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	4
MEM18008B	Balance equipment	2
MEM18009B	Perform levelling and alignment of machines and engineering components	4
MEM18010C	Perform equipment condition monitoring and recording	4

Unit code	Unit title	P
MEM18011C	Shut down and isolate machines/equipment	2
MEM18012B	Perform installation and removal of mechanical seals	2
MEM18013B	Perform gland packing	2
MEM18014B	Manufacture press tools and gauges	8
MEM18015B	Maintain tools and dies	4
MEM18018C	Maintain pneumatic system components	4
MEM18019B	Maintain pneumatic systems	4
MEM18020B	Maintain hydraulic system components	4
MEM18021B	Maintain hydraulic systems	4
MEM18022B	Maintain fluid power controls	8
MEM18024B	Maintain engine cooling systems	2
MEM18025B	Service combustion engines	2
MEM18026C	Test compression ignition fuel systems	4
MEM18027C	Overhaul engine fuel system components	8
MEM18028B	Maintain engine lubrication systems	2
MEM18029B	Tune diesel engines	4
MEM18030B	Diagnose and rectify low voltage electrical systems	8
MEM18031B	Diagnose and rectify low voltage starting systems	2

Unit code	Unit title	P
MEM18032B	Maintain induction/exhaust systems	4
MEM18033B	Perform engine bottom-end overhaul	4
MEM18034B	Perform engine top-end overhaul	8
MEM18035B	Diagnose and rectify braking systems	6
MEM18037B	Diagnose and rectify low voltage charging systems	2
MEM18038B	Maintain wheels and tyres	2
MEM18039B	Diagnose and rectify track type undercarriage	4
MEM18040B	Maintain suspension systems	4
MEM18041B	Maintain steering systems	4
MEM18042C	Diagnose and rectify manual transmissions	4
MEM18043C	Diagnose and rectify automatic transmissions	8
MEM18044C	Diagnose and rectify drive line and final drives	4
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	4
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	4

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

Unit code	Unit title	P
MEM18064B	Maintain instrumentation system components	6
MEM18065B	Diagnose and repair digital equipment and components	10
MEM18066B	Diagnose and repair microprocessor-based equipment	6
MEM18067B	Tune control loops - multi controller or multi element systems	6
MEM18071B	Connect/disconnect fluid conveying system components	2
MEM18072B	Manufacture fluid conveying conductor assemblies	4
MEM18086B	Test, recover, evacuate and charge refrigeration systems	4
MEM18087B	Service and repair domestic and light commercial refrigeration and air conditioning equipment	6
MEM18088B	Maintain and repair commercial air conditioning systems and components	4
MEM18089B	Maintain and repair central air handling systems	6
MEM18090B	Maintain and repair industrial refrigeration systems and components	6
MEM18091B	Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems	4
MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or	6

Unit code	Unit title	P
	air conditioning controls	
MEM18094B	Service and repair commercial refrigeration	6
MEM18095A	Maintain and repair cooling towers/evaporative condensers and associated equipment	4
MEM18096A	Maintain, repair/replace and adjust refrigerant flow controls and associated equipment	6
MEM18097A	Manufacture cavity dies	8
MEM18098A	Prepare to perform work associated with fuel system installation and servicing*	2

Group B - Trade Specialisation units

- Select units from the Certificate III Trade Specialisation units listed in Appendix 1, Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites.
-

MEM30305 Certificate III in Engineering - Fabrication Trade

Modification History

ISC upgrade to include new units in Trade Specialisation list. Refer to Mapping of Changes.

Description

This qualification covers the skills and knowledge required for employment as an Engineering Tradesperson - Fabrication within the metal, engineering, manufacturing and associated industries or other industries where Engineering Tradespersons - Fabrication work. The qualification has been specifically developed to meet the needs of apprentices in the above trade. The qualification packaging has been developed on an assumption that competency will be developed through an integrated combination of on and off-the-job learning strategies such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles/employment outcomes
The Certificate III in Engineering - Fabrication Trade specifies the competencies required for employment as an Engineering Tradesperson - Fabrication including metal fabrication, forging, founding, structural steel erection, electroplating, metal spinning, metal polishing, sheet metal work, welding and the use of related computer controlled equipment. Employment outcomes related to this qualification are found in a wide variety of manufacturing and engineering related sectors as well as Engineering Tradesperson - Fabrication roles in other industries.

Application
This qualification is designed to provide an industry recognised skills profile related to trade work as an Engineering Tradesperson - Fabrication. Skills development would usually be undertaken through an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.
Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.
Occupational titles that this qualification is suitable for may vary and include metal fabrication tradesperson, boilermaker, 1st class sheet metal worker, 1st class welder, moulder, foundry tradesperson and patternmaker.

Pathways Information

Pathways into the qualification
There is no qualification entry requirement. It is assumed that the learner is engaged as an apprentice under a Training Contract and that the learner is receiving appropriate structured on the job training while undertaking this qualification.

This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed MEM10105 Certificate I in Engineering, MEM10205 Certificate I in Boating Services, MEM20105 Certificate II in Engineering, MEM20205 Certificate II in Engineering - Production Technology or other relevant qualifications. Credit towards this qualification may also include units of competency contained within relevant pre-vocational and pre-apprenticeship programs and Statements of Attainment.

Pathways from the qualification
Further training pathways from this qualification include MEM40105 Certificate IV in Engineering and MEM50105 Diploma of Engineering - Advanced Trade or other relevant qualifications.

Additional qualification advice
An additional descriptor may be added to this qualification to illustrate a particular skill focus or trade discipline.
This could be achieved by adding a pathway descriptor or sentence *below* the formal title of the qualification. Note that no changes may be made to the qualification title and the use of one of these descriptors to a qualification does not change the qualification's formal title or unique national code.
There are no specific requirements associated with the use of these descriptors other than their use should reflect the nature of the choice of units of competency in the qualification and must be consistent with the work role of an Engineering Tradesperson - Fabrication.
Reference to other occupational or functional pathways consistent with the role of an Engineering Tradesperson - Fabrication may be included on any qualification statement that is issued.
Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing considerations
There are no specific licences that relate to this qualification. However, some units of competency in this qualification may relate to licensing or regulatory requirements. Local regulations should be checked for details.

Licensing/Regulatory Information

Refer to Pathways Information

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Convey and share technical information • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common fabrication terminology • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Use diagnostic skills to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships • Economise material use and minimise waste

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Planning and organising	• Plan, prioritise and sequence work operations/complete activities/scheduled production • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental guidelines and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, tools and equipment to achieve the required outcome

Packaging Rules

Packaging Rules

The minimum requirements for achievement of the Certificate III in Engineering - Fabrication Trade are:

- completion of all core units of competency listed below, and
- completion of Group A Fabrication stream units listed below to the value of at least 40 points, and
- completion of units from Group B Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Fabrication Trade occupational outcomes.

Additional qualification descriptors

The following additional descriptors are approved for use with this qualification: Casting and Moulding; Heavy Fabrication; Light Fabrication; Maintenance; Patternmaking; Surface Finishing; Welding.

Core units

- select all of the units from this list

Unit code	Unit title
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task

Unit code	Unit title
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective Units

Group A - Fabrication Trade stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM03003B	Perform sheet and plate assembly	4
MEM04001B	Operate melting furnaces	4
MEM04002B	Perform gravity die casting	2
MEM04003B	Operate pressure die casting machine	4
MEM04004B	Prepare and mix sand for metal moulding	4
MEM04005C	Produce moulds and cores by hand (jobbing)	16
MEM04006B	Operate sand moulding and core making machines	8

Unit code	Unit title	P
MEM04007B	Pour molten metal	4
MEM04008B	Fettle and trim metal castings/forgings	4
MEM04010B	Develop and manufacture wood patterns	20
MEM04011B	Produce polymer patterns	8
MEM04012B	Assemble plated patterns	8
MEM04013B	Develop and manufacture polystyrene patterns	2
MEM04014B	Develop and manufacture production patterns	8
MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment	6
MEM04016C	Develop and manufacture precision models	6
MEM04017B	Develop and manufacture gear, conveyor screw and propeller patterns	4
MEM04018B	Perform general woodworking machine operations	4
MEM04019B	Perform refractory installation and repair	4
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4

Unit code	Unit title	P
MEM05003B	Perform soft soldering	2
MEM05004C	Perform routine oxy acetylene welding	2
MEM05005B	Carry out mechanical cutting	2
MEM05006C	Perform brazing and/or silver soldering	2
MEM05007C	Perform manual heating and thermal cutting	2
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping	2
MEM05009C	Perform automated thermal cutting	2
MEM05010C	Apply fabrication, forming and shaping techniques	8
MEM05011D	Assemble fabricated components	8
MEM05012C	Perform routine manual metal arc welding	2
MEM05013C	Perform manual production welding	2
MEM05014C	Monitor quality of production welding/fabrications	2
MEM05015D	Weld using manual metal arc welding process	4
MEM05016C	Perform advanced welding using manual metal arc welding process	4
MEM05017D	Weld using gas metal arc welding process	4
MEM05018C	Perform advanced welding using gas metal arc welding process	4

Unit code	Unit title	P
MEM05019D	Weld using gas tungsten arc welding process	4
MEM05020C	Perform advanced welding using gas tungsten arc welding process	4
MEM05022C	Perform advanced welding using oxy acetylene welding process	6
MEM05023C	Weld using submerged arc welding process	4
MEM05026C	Apply welding principles	4
MEM05036C	Repair/replace/modify fabrications	4
MEM05037C	Perform geometric development	6
MEM05038B	Perform advanced geometric development - cylindrical/rectangular	2
MEM05039B	Perform advanced geometric development - conical	2
MEM05040B	Perform advanced geometric development - transitions	4
MEM05041B	Weld using powder flame spraying	4
MEM05047B	Weld using flux core arc welding process	4
MEM05048B	Perform advanced welding using flux core arc welding process	4
MEM05049B	Perform routine gas tungsten arc welding	2
MEM05050B	Perform routine gas metal arc welding	2

Unit code	Unit title	P
MEM05051A	Select welding processes	2
MEM05052A	Apply safe welding practices	4
MEM05053A	Set and edit computer controlled thermal cutting machines	4
MEM05054A	Write basic NC/CNC programs for thermal cutting machines	4
MEM06001B	Perform hand forging	4
MEM06002B	Perform hammer forging	4
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6
MEM06005B	Perform drop and upset forging	4
MEM06006C	Repair springs	4
MEM06008A	Hammer forge complex shapes	4
MEM06009A	Hand forge complex shapes	4
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2

Unit code	Unit title	P
MEM08007B	Control surface finish production and finished product quality	4
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6
MEM08019B	Electroplate protective finishes	6
MEM08020B	Electroplate decorative finishes	6
MEM09002B	Interpret technical drawing	4
MEM10001C	Erect structures	4
MEM12007D	Mark off/out structural fabrications and shapes	4
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held	2

Unit code	Unit title	P
	operations	
MEM18098A	Prepare to perform work associated with fuel system installation and servicing*	2

Group B - Trade Specialisation units

Select units from the Certificate III Trade Specialisation units listed in Appendix 1, Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites.

MEM30405 Certificate III in Engineering - Electrical/Electronic Trade

Modification History

Updated one unit of competency - MEM05006B to MEM05006C

Description

This qualification covers the skills and knowledge required for employment as an Engineering Tradesperson - Electrical/Electronic within the metal, engineering, manufacturing and associated industries or other industries where Engineering Tradespersons - Electrical/ Electronic work. The qualification has been specifically developed for apprentices in the above trade. The qualification packaging has been developed on an assumption that competency will be developed through an integrated combination of on and off-the-job learning strategies such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles*/*employment outcomes
The Certificate III in Engineering - Electrical/Electronic Trade specifies the competencies required for employment as an Engineering Tradesperson - Electrical/Electronic including the design, assembly, manufacture, installation, modification, testing, fault finding, commissioning, maintenance and service of all electrical and electronic devices systems, equipment and controls e.g. electrical wiring, motors, generators, PLCs, and other electronic controls, instruments, refrigeration, telecommunications, radio and television, communication and information processing.
Employment outcomes related to this qualification are found in a wide variety of manufacturing and engineering related sectors as well as Engineering Tradesperson - Electrical/Electronic trade related roles in other industries.

Application
This qualification is designed to provide an industry recognised skills profile related to trade work as an Engineering Tradesperson - Electrical/Electronic. Skills development would usually be undertaken through an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.
Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.
Occupational titles at the enterprise level covered by this qualification may vary and include engineering tradesperson - electrical/electronic, electrical fitter, electrical mechanic, electrical fitter/mechanic, electrician, refrigeration mechanic and radio tradesperson.

Pathways Information

Pathways into the qualification
While there is no qualification entry requirement, it is assumed that the learner is engaged as an apprentice under a Training Contract and that the learner is receiving appropriate structured on-the-job training while undertaking this qualification.

This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed MEM10105 Certificate I in Engineering, MEM10205 Certificate I in Boating Services, MEM20105 Certificate II in Engineering, MEM20205 Certificate II in Engineering - Production Technology or other relevant qualifications. Credit towards this qualification may also include units of competency contained within relevant pre-vocational and pre-apprenticeship programs and Statements of Attainment.

Pathways from the qualification
Further training pathways from this qualification include MEM40105 Certificate IV in Engineering, MSA41108 Certificate IV in Competitive Manufacturing, MSA40108 Certificate IV in Manufacturing Technology or other relevant qualifications.

Additional qualification advice
An additional descriptor may be added to this qualification title to illustrate a particular skills profile.
This could be achieved by adding a pathway descriptor or sentence *below* the formal title of the qualification. Note that no changes may be made to the qualification title and the use of one of these descriptors to a qualification does not change the qualification's formal title or unique national code.
There are no specific requirements associated with the use of these descriptors other than their use should reflect the nature of the choice of units of competency in the qualification and must be consistent with the work role of an Engineering Tradesperson - Electrical/Electronic. Reference to other occupational or functional pathways consistent with the role of an Engineering Tradesperson - Electrical/Electronic may be included on any qualification statement that is issued.
Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing considerations
If appropriate electives are undertaken this qualification can be used as the basis for an application in each state and territory for a license to practise as an electrician. It can also be used to satisfy regulations regarding refrigeration and airconditioning work. Local regulations should be checked for details.

Licensing/Regulatory Information

Refer to Pathways Information

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret and follow information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Interpret, record and communicate information including measurements • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common workplace terminology • Tag, mark or label cabling for identification • Interpret circuit diagrams • Provide advice on minimising electricity use • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Use diagnostic skills and tests to identify and determine causes of electrical faults, including interpretation of in-built fault indicators and error codes • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships
Planning and organising	• Plan, prioritise and sequence work operations/complete activities/scheduled production • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, codes of practice, environmental guidelines and product/process developments • Assist with on the job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Perform calculations using a calculator • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles,

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	techniques, procedures, tools and equipment to achieve the required outcome • Apply techniques, tools and equipment required to install/maintain electrical equipment/systems/components • Use tools, equipment and techniques to test the operation of electrical equipment/components/systems • Calibrate instrumentation equipment/components

Packaging Rules

Packaging Rules

The minimum requirements for achievement of the Certificate III in Engineering - Electrical/Electronic Trade are:

- completion of all core units of competency listed below, and
- completion of units from the Group A Electrical/Electronic Stream to the value of at least 40 points, and
- completion of units from Group B Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Electrical/Electronic Trade occupational outcomes

Additional qualification descriptors

The following additional descriptors are approved for use with this qualification: Refrigeration and Air-conditioning; Instrumentation; Maintenance; Marine Electronics.

Core Units

- select all of the units from this list

Unit code	Unit title
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Electives
Group A - Electrical/Electronic Trade stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4
MEM05003B	Perform soft soldering	2

Unit code	Unit title	P
MEM05006C	Perform brazing and/or silver soldering	2
MEM09002B	Interpret technical drawing	4
MEM10002B	Terminate and connect electrical wiring	3
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.	12
MEM12002B	Perform electrical/electronic measurement	2
MEM12004B	Perform precision electrical/electronic measurement	4
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18045B	Fault find/repair electrical equipment/components up to 250 volts single phase supply	4
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	4
MEM18048B	Fault find and repair/rectify basic electrical circuits	12
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3
MEM18050C	Disconnect/reconnect fixed wired	3

Unit code	Unit title	P
	equipment over 1000 volts a.c./1500 volts d.c.	
MEM18051B	Fault find and repair/rectify complex electrical circuits	6
MEM18052B	Maintain fluid power systems for mobile plant	4
MEM18054B	Fault find, test and calibrate instrumentation systems and equipment	8
MEM18055B	Dismantle, replace and assemble engineering components	3
MEM18056B	Diagnose and repair analog equipment and components	10
MEM18057B	Maintain/service analog/digital electronic equipment	6
MEM18058C	Modify electronic equipment	4
MEM18060B	Maintain, repair control instrumentation - single and multiple loop control systems	8
MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements	8
MEM18063B	Terminate signal and data cables	4
MEM18064B	Maintain instrumentation system components	6
MEM18065B	Diagnose and repair digital equipment and components	10
MEM18098A	Prepare to perform work associated with fuel system installation and	2

Unit code	Unit title	P
	servicing*	

Group B - Trade Specialisation units
Select units from the Certificate III Trade Specialisation units listed in Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites

Note: The following units of competency are required to meet the National Uniform Electrical Licensing '66 essential capabilities' for an electrician's license.

Unit code	Unit title	P
MEM12023A	Perform engineering measurements	n/a
MEM12024A	Perform computations	n/a
MEM13014A	Apply principles of occupational health and safety in the work environment	n/a
MEM14004A	Plan to undertake a routine task	n/a
MEM14005A	Plan a complete activity	n/a
MEM15002A	Apply quality systems	n/a
MEM15024A	Apply quality procedures	n/a
MEM16006A	Organise and communicate information	n/a
MEM16007A	Work with others in a manufacturing, engineering or related environment	n/a
MEM16008A	Interact with computing technology	n/a
MEM17003A	Assist in the provision of on the job training	n/a
MEM09002B	Interpret technical drawing	4
MEM10002B	Terminate and connect electrical wiring	3

Unit code	Unit title	P
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.	12
MEM10004B	Enter and change programmable controller operational parameters	2
MEM10011B	Terminate and connect specialist cables	3
MEM12002B	Perform electrical/electronic measurement	2
MEM12004B	Perform precision electrical/electronic measurement	4
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10
MEM18048B	Fault find and repair/rectify basic electrical circuits	12
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3
MEM18051B	Fault find and repair/rectify complex electrical circuits	6
	Points total	65

MEM30505 Certificate III in Engineering - Technical

Modification History

Release 2 - Addition of new and updated elective units covering skills in computer-aided design/drafting (CAD) operations. Outcomes are equivalent.

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce detail drawings using standard engineering drawing symbols, references and terminology • Prepare drafts of functional and operational requirements • Liaise with internal and external stakeholders • Use communication and negotiation skills • Write reports
Teamwork	• Work alone or as part of a team • Verify operational requirements with supervisor or team
Problem-solving	• Analyse information according to enterprise and work requirements • Apply mathematical techniques to solve problems • Analyse manufacturing/ production system components • Apply engineering principles to translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Implement OHS risk management procedures • Economise material use and minimise waste and energy use • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including procedures to improve processes, quality, environmental performance, and internal/external customer/supplier relationships
Planning and organising	• Organise, categorise and sequence information • Plan and sequence work operations/complete activities/scheduled production • Source and organise required information from workshop manuals, customer specifications, product suppliers, designers or similar
Self-management	• Take responsibility for work outcomes • Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and

	legislative requirements
Learning	• Use manuals, online help and other reference materials as required • Check and clarify task-related information • Assess and modify own work practices • Research equipment function and operational requirements • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments
Technology	• Know functions and capabilities of various types of computing technology and software used in the workplace • Use a CAD program, computer and peripherals • Apply knowledge of basic mechanical components, drive components, pneumatic systems, hydraulic systems

Packaging Rules

The minimum requirements for achievement of the Certificate III in Engineering - Technical are:

- completion of the three (3) core units of competency listed below, and
- completion of seven (7) elective units of competency from the list below to bring the total of units selected to ten (10).

Note that when selecting elective units any prerequisite units must also be completed and can be counted towards the required number of elective units (refer to units and prerequisites listing in Appendix 2).
Note also that additional requirements apply to the selection of non-destructive testing units. These additional requirements are listed at the end of the elective units.
Up to two (2) appropriate electives may be chosen from other endorsed Training Packages and accredited courses where those units are available in a Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core units

- Select all of the units from this list.

Unit code	Unit title
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MSAENV272B	Participate in environmentally sustainable work practices

Note: It is anticipated that many learners will have gained these skills through Year 12 school study and be eligible for recognition of prior learning. The actual awarding of the units will be subject to assessment by the Registered Training Provider offering the qualification.

Elective units

- Select seven (7) units from this list.

Unit code	Unit title	Prerequisites
MEM05051A	Select welding processes	
MEM09002B	Interpret a technical drawing	
MEM09201A	Work effectively in an engineering drafting workplace	
MEM09202A	Produce freehand sketches	
MEM09203A	Measure and sketch site information	
MEM09205A	Produce electrical schematic drawings	*
MEM09208A	Detail fasteners and locking devices in mechanical drawings	*
MEM09209A	Detail bearings, seals and other componentry in mechanical drawings	*
MEM09213A	Produce schematic drawings for hydraulic and pneumatic fluid power systems	*
MEM12023A	Perform engineering measurements	
MEM12024A	Perform computations	

MEM13013B	Work safely with ionizing radiation	
MEM15001B	Perform basic statistical quality control	
MEM16003B	Provide advanced customer service	
MEM18001C	Use hand tools	
MEM24001B	Perform basic penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*
MEM24007B	Perform ultrasonic thickness testing	*
MEM24009B	Perform basic radiographic testing	*
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30009A	Contribute to the design of basic mechanical systems	*
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30014A	Apply basic just in time systems to the reduction of waste	
MEM30015A	Develop recommendations for basic set up time	

	improvements	
MEM30016A	Assist in the analysis of a supply chain	
MEM30017A	Use basic preventative maintenance techniques and tools	
MEM30018A	Undertake basic process planning	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30020A	Develop and manage a plan for a simple manufacturing related project	
MEM30021A	Prepare a simple production schedule	
MEM30022A	Undertake supervised procurement activities	
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30025A	Analyse a simple electrical system circuit	*
MEM30026A	Select and test components for simple electronic switching and timing circuits	*
MEM30027A	Prepare basic programs for programmable logic controllers	
MEM30028A	Assist in sales of technical products/systems	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*

MSATCS302A	Detail bolts and welds for structural steelwork connections	*

Special requirements for the selection of Non-destructive Testing units
In order to ensure that the Certificate III in Engineering - Technical aligns to occupational outcomes in industry the following additional rules apply to the selection of the following units -

Only two (2) of the following units can be selected within the qualification:

MEM24001B	Perform basic penetrant testing	*
MEM24003B	Perform basic magnetic particle testing	*
MEM24005B	Perform basic eddy current testing	*

And, only one (1) of the following units can be selected within the qualification:

MEM24007B	Perform ultrasonic thickness testing	*
MEM24009B	Perform basic radiographic testing	*

MEM30605 Certificate III in Jewellery Manufacture

Modification History

Updated one unit of competency - MEM05006B to MEM05006C

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job packets, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, illustrations and renderings • Check and clarify task-related information • Recognise and use common jewellery and horological terminology
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Interpret design and fabrication requirements and translate into practical outcomes • Use diagnostic skills to identify and determine causes of problems • Diagnose precision micro-mechanisms
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Economise material use and minimise waste • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships
Planning and organising	• Plan, prioritise and sequence work operations • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations. environmental guidelines and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines, including high tolerance/precision tools and equipment • Use high magnification optics • Use gem setting techniques, tools, processes and procedures • Select and use appropriate measuring/testing devices • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications

Packaging Rules

The minimum requirements for achievement of the Certificate III in Jewellery Manufacture are:

- completion of all core units of competency listed below, and
- completion of Group A Jewellery Manufacture stream units from the list below to the value of at least 40 points, and

- completion of units from Group B Certificate III Trade specialisation units listed in Appendix I, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.
Only select units that would be suitable for Jewellery Manufacture occupational outcomes

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core Units

- select all of the units from this list

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment

Unit code	Unit title
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Electives

Group A - Jewellery Manufacture stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly	4
MEM03006B	Set assembly stations	2
MEM05006C	Perform brazing and/or silver soldering	2
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07005C	Perform general machining	8
MEM07024B	Operate and monitor machine/process	4
MEM07032B	Use workshop machines for basic operations	2
MEM07040A	Set multistage integrated processes	6
MEM08001B	Perform wire, jig and barrel	4

Unit code	Unit title	P
	load/unload work	
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM09002B	Interpret technical drawing	4
MEM13002B	Undertake occupational health and safety activities in the workplace	3
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM15004B	Perform inspection	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work	4
MEM19001B	Perform jewellery metal casting	6
MEM19002B	Prepare jewellery illustrations	4
MEM19003B	Handle gem materials	2
MEM19004B	Handle and examine gemstone materials	6
MEM19005B	Produce three-dimensional precision items	8

Unit code	Unit title	P
MEM19006B	Replace watch batteries	1
MEM19007B	Perform gemstone setting	6
MEM19008B	Prepare jewellery designs	6
MEM19009B	Perform investment procedures for lost wax casting process	1
MEM19010B	Produce rubber moulds for lost wax casting process	2
MEM19011B	Perform wax injection of moulds for lost wax casting process	2
MEM19012B	Produce jewellery wax model	4
MEM19013B	Produce jewellery metal masters	4
MEM19014B	Perform hand engraving	4
MEM19015B	Perform jewellery enamelling	4
MEM19016B	Construct jewellery components	4
MEM19017B	Fabricate jewellery items	6
MEM19018B	Repair jewellery items	6
MEM19020B	Fault-find and maintain micro-mechanisms	4
MEM19021B	Diagnose and service micro-mechanisms	6
MEM19022B	Perform precision micro-mechanism diagnosis and servicing	6

Group B -Trade Specialisation units
Select units from Certificate III Trade Specialisation units listed in Appendix 1, Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites.

MEM30705 Certificate III in Marine Craft Construction

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs and 3D shapes (lofting) • Check and clarify task-related information • Recognise and use common marine terminology • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Assess operation and condition of components against specifications or manufacturer's requirements • Translate designs into practical outcomes • Use diagnostic skills and tests to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Economise material use and minimise waste and negative environmental impacts • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Planning and organising	• Plan, prioritise and sequence work operations • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate materials and adjustment of equipment • Inspect and prepare worksite
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, environmental guidelines, codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of marine systems and engineering principles, techniques, procedures, tools and equipment to achieve the required outcome • Use CAD equipment

Packaging Rules

The minimum requirements for achievement of the Certificate III in Marine Craft Construction are:

- completion of all core units of competency listed below, and
- completion of Group A Marine Craft Construction stream units from the list below to the value of at least 40 points, and
- completion of units from Group B - Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Marine Craft Construction occupational outcomes

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core Units

- select all of the units from this list

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems

Unit code	Unit title
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective Units

Group A - Marine Craft Construction stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM04018B	Perform general woodworking machine operations	4
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07024B	Operate and monitor machine/process	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08014B	Apply protective coatings (basic)	4
MEM09002B	Interpret technical drawing	4
MEM09021B	Interpret and produce curved 3-dimensional shapes	4

Unit code	Unit title	P
MEM12007D	Mark off/out structural fabrications and shapes	4
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM25001B	Apply fibre-reinforced materials	2
MEM25002B	Form and integrate fibre-reinforced structures	4
MEM25003B	Set up marine vessel structures	4
MEM25004B	Fair and shape surfaces	2
MEM25005B	Construct and assemble marine vessel timber components	8
MEM25006B	Undertake marine sheathing operations	2
MEM25007B	Maintain marine vessel surfaces	4
MEM25008B	Repair marine vessel surfaces and structures	4
MEM25009B	Form timber shapes using hot processes	2
MEM25010B	Perform fitout procedures	4
MEM25011B	Install marine systems	8
MEM25012B	Install and test operations of marine	6

Unit code	Unit title	P
	auxiliary systems	
MEM25013B	Produce three-dimensional plugs/moulds	12
MEM25014B	Perform marine slipping operations	2
MEM25015A	Assemble and install equipment and accessories/ancillaries	2
MEM50002B	Work safely on marine craft	1
MEM50003B	Follow work procedures to maintain the marine environment	1
MEM50004B	Maintain quality of environment by following marina codes	1
MEM50009B	Safely operate a mechanically powered recreational boat	2

Group B - Trade Specialisation units
Select units from Certificate III Trade Specialisation units listed in Appendix I, Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites

MEM30805 Certificate III in Locksmithing

Modification History

Not Applicable

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or tables • Check and clarify task-related information • Recognise and use common locksmithing terminology • Provide customer advice on locksmithing products and options • Verify authenticity
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake basic numerical operations and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Use diagnostic skills and tests to identify and determine causes of problems • Decode lock/key mechanism • Produce key codes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships
Planning and organising	• Plan, prioritise and sequence work operations

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate materials and adjustment of equipment • Establish entry requirements, authorisations and ownership
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, environmental requirements, codes of practice and product/process developments • Assist with on the job training and assessment • Seek specialist advice on areas outside own competence
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate locksmithing principles, techniques, procedures, tools and equipment to achieve the required outcome • Apply knowledge of key systems and lock mechanisms

Packaging Rules

The minimum requirements for achievement of the Certificate III in Locksmithing are:

- completion of all core units of competency listed below, and
- completion of Group A Locksmithing stream units from the list below to the value of at least 40 points, and
- completion of units from Group B Certificate III Trade specialisation units listed in Appendix 1, Volume 1 of the Training Package, to bring the total value to at least 73 points

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Only select units that would be suitable for Locksmithing occupational outcomes

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core Units

- select all of the units from this list

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems

Unit code	Unit title
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective Units

Group A - Locksmithing stream units

- select units from this list to the value of at least 40 points

Unit code	Unit title	P
MEM05007C	Perform manual heating and thermal cutting	2
MEM09002B	Interpret technical drawing	4
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM20001A	Produce keys	4
MEM20002A	Assemble and test lock mechanisms	6
MEM20003A	Install and upgrade locks and hardware	4
MEM20004A	Gain entry	4
MEM20005A	Install and maintain door control devices/systems	2
MEM20006A	Maintain and service mechanical locking	6

Unit code	Unit title	P
	devices	
MEM20007A	Plan and prepare a masterkey system	4
MEM20008A	Develop and implement a masterkey system	6
MEM20009A	Gain entry and reinstate fire and security containers	4
MEM20010A	Gain entry and reinstate automotive locking systems	4
MEM20011A	Service and repair fire and security containers	6
MEM20012A	Service and repair mechanical automotive locking systems	4
MEM20013A	Service automotive transponder systems	2
MEM20014A	Perform a site security survey	2

Group B - Trade Specialisation units
Select units from Certificate III Trade Specialisation units listed in Appendix 1, Volume 1 of MEM05 to bring the total value of units to at least 73 points, including any prerequisites.

MEM30905 Certificate III in Boating Services

Modification History

Release 3 - Title corrected for unit MEM05003B Perform soft soldering

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common boating terminology • Follow verbal instructions • Complete written and verbal reports • Use boating communication systems, methods and signals to convey messages
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify and delegate work roles • Demonstrate leadership skills
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer's requirements • Identify environmental issues and requirements applying to own work and that of others • Use diagnostic skills and tests to identify and determine causes of problems • Interpret weather forecasts • Use navigational aids to determine boat position
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Modify work plan to overcome unforeseen difficulties or

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships • Assist the business to maintain the quality of the environment • Optimise material use and minimise waste • Implement emergency procedures to protect persons on board
Planning and organising	• Plan, prioritise and sequence work operations • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate materials and adjustment of equipment • Carry out trip preparation and planning
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental guidelines and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications. • Follow emergency drills • Minimise impact on the environment
Learning	• Check and clarify task related information with appropriate personnel • Identify customers' requirements with respect to the operation or quality of the product or service • Review and modify work progress to complement the work of others • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments
Technology	• Select and use appropriate tools, materials, equipment and machines • Select and use appropriate measuring/testing devices • Use navigation and communication systems and equipment

Packaging Rules

The minimum requirements for achievement of the Certificate III in Boating Services are:

- completion of all nine (9) core units of competency listed below, and
- completion of thirteen (13) elective units from the list below to bring the total number of units to twenty one (21).

Note that when selecting elective units any prerequisite units must also be completed and count towards the required number of elective units (refer to units for details).
Up to four appropriate electives may be chosen from other endorsed Training Packages and accredited courses where those units are available in a Certificate III. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the NSSC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Only select units that would be suitable for Boating Services occupational outcomes.

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core Units

- select all of the units from this list

Unit code	**Unit title**
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM50001B	Classify recreational boating technologies and features
MEM50002B	Work safely on marine craft
MEM50003B	Follow work procedures to maintain the marine environment

Unit code	Unit title
MSAENV272B	Participate in environmentally sustainable work practices

Elective units

- Select 13 units from this list.

Unit code	Unit title
MEM04018B	Perform general woodworking machine operations
MEM05003B	Perform soft soldering
MEM05005B	Carry out mechanical cutting
MEM05007C	Perform manual heating and thermal cutting
MEM05012C	Perform routine manual metal arc welding
MEM05050B	Perform routine gas metal arc welding
MEM09002B	Interpret technical drawing
MEM11010B	Operate mobile load shifting equipment
MEM11011B	Undertake manual handling
MEM12023A	Perform engineering measurements
MEM12006C	Mark off/out (general engineering)
MEM12007D	Mark off/out structural fabrications and shapes
MEM13003B	Work safely with industrial chemicals and materials
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM25001B	Apply fibre-reinforced plastics
MEM25004B	Fair and shape surfaces

Unit code	Unit title
MEM25007B	Maintain marine vessel surfaces
MEM50004B	Maintain quality of environment by following marina codes
MEM50005B	Refuel vessels
MEM50006B	Check operational capability of marine craft
MEM50007B	Check operational capability of sails and sail operating equipment
MEM50008B	Carry out trip preparation and planning
MEM50009B	Safely operate a mechanically powered recreational boat
MEM50010B	Respond to boating emergencies and incidents
TLILIC0012A	Licence to operate a vehicle loading crane (capacity 10 metre tonnes and above)
TLILIC2001A	Licence to operate a forklift truck

MEM31010 Certificate III in Watch and Clock Service and Repair

Modification History

Not Applicable

Description

This qualification has been specifically developed for apprentices in trades related to watch and clock servicing and repair and describes the skills and knowledge required to perform trade work in watch and clock service and repair. The qualification packaging has been developed on an assumption that competency will be developed through a combination of on and off-the-job learning strategies. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles/employment outcome
The Certificate III in Watch and Clock Service and Repair specifies the competencies required for employment as a watch and clock service and repair tradesperson, including the disassembly, assembly, installation, adjustment, replacement, modification, testing, fault-finding, and maintenance and service of watch and clock cases, mechanisms and other relevant components.
Employment outcomes directly associated with this qualification are found in a variety of watch and clock service related businesses, including retail stores, manufacturer service centres and specialist watch and clock service and repair businesses, including self employment.

Application
This qualification is designed to reflect the industry recognised skills profile associated with trade work as a watch and clock service and repair tradesperson. Skills development would typically be undertaken through an Australian Apprenticeship arrangement where the integration of on and off-the-job training would be specified in the Training Plan associated with the Training Contract between the employer and apprentice.

Pathways Information

Pathways into the qualification
There is no qualification entry requirement. It is assumed that the learner is engaged as an apprentice under a Training Contract and is involved in appropriate structured on-the-job learning while undertaking this qualification.
This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed MEM10105 Certificate I in Engineering, MEM20105 Certificate II in Engineering, MEM20205 Certificate II in Engineering - Production Technology or other qualifications relevant to watch and clock service and repair. Credit towards this qualification may also include units of competency contained within relevant pre-vocational and pre-apprenticeship programs and Statements of Attainment.

Pathways from the qualification
Further training pathways from this qualification include MEM40105 Certificate IV in Engineering and MEM50105 Diploma of Engineering - Advanced Trade or other relevant qualifications.

Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing considerations
There are no specific licences that relate to this qualification.

Licensing/Regulatory Information

Refer to Pathways Information

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job packets, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, illustrations and renderings • Check and clarify task-related information • Recognise and use common horological terminology
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Interpret service and repair requirements and translate into practical outcomes • Use diagnostic skills to identify and determine causes of problems • Diagnose precision micro-mechanisms
Initiative and enterprise	• Apply the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Economise material use and minimise waste • Participate in improvement procedures, including process, quality and internal/external customer/supplier relationships
Planning and organising	• Plan, prioritise and sequence work operations • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work, including selection of appropriate tools, equipment and materials and adjustment of equipment

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer recommendations and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications
Learning	• Check and clarify task-related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials, such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments • Assist with on-the-job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines, including high tolerance/precision tools and equipment • Use high magnification optics • Use watch and clock service and repair techniques, tools, processes and procedures • Select and use appropriate measuring/testing devices • Navigate technology to access/input/store/retrieve/save and produce information/data using appropriate software applications

Packaging Rules

Packaging rules

The minimum requirements for achievement of the Certificate III in Watch and Clock Service and Repair are:

- completion of all core units of competency listed below

- completion of elective units to a total value of at least 73 points, chosen as described below:
  - watch and clock stream units from Group A to the value of at least 40 points; and
  - trade specialisation units from Group B to bring the total value to at least 73 points.

Units with prerequisites are marked with an asterisk. Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.
Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Only select units that would be suitable for occupational outcomes in a watch and clock service and repair environment.

Core units of competency

- Select all of the units from this list.

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014B	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment

Unit code	Unit title
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective units of competency

Group A - Watch and Clock stream units

- Select units from this list to the value of at least 40 points.

Unit code	Unit title	P
MEM05001B	Perform manual soldering/desoldering, electrical/electronic components	4
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM07005C	Perform general machining*	8
MEM09002B	Interpret technical drawing	4
MEM12002B	Perform electrical/electronic measurements	2
MEM18001C	Use hand tools	2
MEM21001A	Replace watch batteries, capacitors and bands	2
MEM21002A	Perform watch movement exchange *	2
MEM21003A	Perform watch case servicing, repair and refurbishment *	4

Unit code	Unit title	P
MEM21004A	Clean watch and clock components	2
MEM21005A	Diagnose faults in quartz watches *	2
MEM21006A	Service quartz watches *	4
MEM21007A	Service complex quartz watches *	4
MEM21008A	Service mechanical watches *	4
MEM21009A	Inspect, diagnose, adjust and repair mechanical watches *	4
MEM21010A	Service watch power generating systems *	2
MEM21011A	Service calendar and other dial indication mechanisms for watches *	4
MEM21012A	Service and repair mechanical watch oscillating systems *	4
MEM21013A	Service, test and adjust watch escapements *	4
MEM21014A	Service mechanical chronograph watches *	6
MEM21015A	Perform precision watch timing and adjustment *	6
MEM21016A	Install and set up clocks	2
MEM21017A	Service and repair clock timepieces	6
MEM21018A	Service clock escapements and oscillating systems *	4
MEM21019A	Service and repair clock striking mechanisms *	4

Unit code	Unit title	P
MEM21020A	Service and repair clock chiming mechanism *	6
MEM21021A	Restore clockwork mechanisms *	6
MEM21022A	Manufacture watch and clock components*	6
MEM21023A	Plan, set up and operate horological workshop or service centre	4
MEM30025A	Analyse a simple electrical system circuit*	4

Group B - specialisation units

- Select units from the Certificate III Trade Specialisation units listed in Appendix I, Volume 1 of this Training Package to bring the total value of units to at least 73 points, including any prerequisites.
- Appropriate specialisation units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III.
-

MEM31112 Certificate III in Engineering - Composites Trade

Modification History

Release 1 - new qualification

Description

This qualification covers the skills and knowledge required by a tradesperson working with composites within the metal, engineering, manufacturing and associated industries, or other industries where composites tradespersons work. The qualification has been specifically developed to meet the needs of apprentices in the above trade. The qualification packaging has been developed on the assumption that competency will be developed through an integrated combination of on and off-the-job learning strategies such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles/employment outcomes

The MEM31112 Certificate III in Engineering - Composites Trade specifies the competencies required for employment as a composites tradesperson, including:

- laying up composites
- selecting and using materials and components for composite products
- handling, using and storing materials and components used in composites
- undertaking repairs and modifications to composite components
- undertaking repairs and modifications using composites
- adjusting resin chemicals for composite products and conditions
- selecting and using joining techniques.

People with this qualification may work in a large manufacturing organisation, a smaller workshop, a repair facility, a defence or a government facility. The composites tradesperson may work in a composites manufacturing or repair organisation, or they may work in an aerospace, civil construction, general manufacturing, marine, vehicle or other organisation as a composites specialist. They may be part of a large organisation or they may be an independent contractor performing composites trade work for other organisations.

'Composites' in this application refers to reinforced resin components and does not include geo-textile or other industrial textiles.

Application

This qualification is designed to provide an industry recognised skills profile related to working as a composites tradesperson. Skills development would usually be undertaken through an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.

This work will generally be undertaken in a factory or workshop environment but may also be undertaken onsite.

Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.

Pathways Information

Pathways into the qualification

There is no qualification entry requirement. It is assumed that the learner is engaged as an apprentice under a Training Contract and that the learner is involved in appropriate structured on-the-job learning while undertaking this qualification.
This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed other relevant qualifications. Credit towards this qualification may also include units of competency contained within relevant pre-vocational and pre-apprenticeship programs and Statements of Attainment.

Pathways from the qualification

Further training pathways from this qualification include MEM40105 Certificate IV in Engineering and MEM50105 Diploma of Engineering – Advanced Trade or other relevant qualifications.
Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

Not applicable.

Employability Skills Summary

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Convey and share technical information • Produce sketches, diagrams, charts or graphs • Check and clarify task-related information • Recognise and use common fabrication terminology • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use appropriate measuring techniques • Inspect quality of own or other employee's work • Analyse information according to enterprise and work requirements • Assess operation and condition of components against specifications or manufacturer’s requirements • Use diagnostic skills to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures, including process, quality and internal/external customer/supplier relationships • Economise material use and minimise waste
Planning and organising	• Plan, prioritise and sequence work operations/complete

	activities/scheduled production • Select and use planning techniques and tools • Organise and analyse information relevant to work • Set up jobs prior to commencement of work, including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental guidelines and legislative requirements • Monitor performance of operation or quality of product or service to ensure customer satisfaction • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturer specifications
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify customers' requirements with respect to the operation or quality of the product or service • Assess and modify own work practices • Use manuals, online help and other reference materials, such as catalogues/lists, as required • Maintain current knowledge of applicable standards, legislation, codes of practice and product/process developments • Assist with on-the-job training and assessment
Technology	• Select and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring/testing devices • Navigate technology to access/input /store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, tools and equipment to achieve the required outcome

Packaging Rules

The minimum requirements for achievement of the MEM31112 Certificate III in Engineering - Composites Trade are:

- completion of all core units of competency listed below
- completion of elective units to a total value of at least 73 points, chosen as described below:
  - basic composite fabrication units from Group A to the value of at least 12 points
  - composite trade specialisation units from Group B to the value of at least 28 points
  - units not already chosen from Group B and trade specialisation units from Group C to bring the total value to at least 73 points.

Units with prerequisites are marked with an asterisk. Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2).
Appropriate Group C elective units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.
Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the flexibility requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Core units of competency

- Select all units from this list.

Unit code	**Unit title**
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment

MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective units of competency

Group A – Composite fabrication units

- Select units from this list to the value of at least 12 points.

Unit code	**Unit title**	**Points**
MEM26001A	Lay up composites using open moulding techniques	6
MEM26002A	Lay up composites using vacuum closed moulding techniques	6
MEM26003A	Lay up composites using pressure closed moulding techniques	6

Group B - Composites trade specialisation units

- Select units from this list to the value of at least 28 points.

Unit code	**Unit title**	**Points**
MEM26004A	Make basic plugs for composites fabrication	3
MEM26005A	Make basic moulds for composites fabrication	3
MEM26006A	Mark and cut out sheets for composite use	4
MEM26007A	Select and use reinforcing appropriate for product	4
MEM26008A	Select and use resin systems appropriate for product	4
MEM26009A	Select and use cores and fillers appropriate for product	2
MEM26010A	Store and handle composite materials	2
MEM26011A	Determine materials and techniques for a composite	6

Unit code	Unit title	Points
	component or product*	
MEM26012A	Record and trial work processes for one-off composite products	4
MEM26013A	Select and use composite processes or systems appropriate for product	4
MEM26014A	Adjust resin chemicals for current conditions	4
MEM26015A	Select and apply repair techniques	6
MEM26016A	Select and use joining techniques	6
MEM26017A	Prepare composite or other substrate surfaces	4
MEM26018A	Organise composite trials	4
MEM26019A	Finish a composite product	4
MEM26020A	Identify and interpret required standards for composites	2

Group C - specialisation units

- Select additional units from Group B or from the Certificate III Trade Specialisation units listed in Appendix I of this Training Package to bring the total value of units to at least 73 points, including any prerequisites.
- Appropriate specialisation units to the value of 16 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate III.
-

Custom Content Section

Not applicable.

MEM40105 Certificate IV in Engineering

Modification History

Release 4 - Imported elective unit AURV225908A replaced by AURVTN2002. No change in outcomes.
Updated one unit of competency - MEM05006B to MEM05006C
Minor formatting corrected

Description

This qualification covers the skills and knowledge required for employment as a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson (Mechanical) - Level II, Special Class Engineering Tradesperson (Fabrication) - Level II, Special Class Engineering Tradesperson (Electrical/Electronic) - Level II within the metal, engineering, manufacturing and associated industries or at equivalent levels in other industries where Engineering Tradespersons work.

The qualification has been specifically developed to be delivered to people who are existing engineering tradespersons or delivered to apprentices in an Engineering Trade who choose to study at a higher level during their apprenticeship. The qualification packaging has been developed on an assumption that competency will be developed through an integrated combination of on and off-the-job learning strategies such as those delivered through a formal apprenticeship. The qualification may also be achieved through formal skills recognition assessment processes.

Job roles/employment outcomes
The Certificate IV in Engineering specifies the competencies required for employment as a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson - Level II in mechanical, electrical/electronic or fabrication trade disciplines. The job role involves application of additional skills in the learner's trade or cross skills from other trades. Job roles may include the design, assembly, manufacture, installation, modification, testing, fault finding, commissioning, maintenance and service of equipment and machinery, the fabrication of structures and assemblies, manufacture of sheet metal work, as well as use of relevant machinery, equipment and joining techniques. Machinery and equipment can include fluid power systems, stationary and mobile equipment, instruments, refrigeration, and the use of computer controlled machine tools.
Employment outcomes related to this qualification are found in a wide variety of manufacturing and engineering related sectors as well as Higher Engineering Tradesperson or a Special Class Engineering Tradesperson - Level II related roles in other industries.

Application
This qualification is designed to provide an industry recognised skills profile related to trade work as a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson - Level II. Skills development would be undertaken through post-apprenticeship training or as part of an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.
Assessment of some units of competency must, where indicated, include evidence of the candidate's performance in a productive work environment where there is a sufficient range of appropriate tasks and materials to cover the scope of application of those units. All outcomes must reflect the standard of performance inherent in the job.

Occupational titles at the enterprise level covered by this qualification may vary and include special class engineering tradesperson - mechanical, fabrication or electrical/electronic, special class mechanical tradesperson, fitter and turner, fitter and machinist, maintenance fitter, diesel fitter, plant mechanic, 1st class machinist, special class metal fabrication tradesperson, boilermaker, sheet metal worker, welder, moulder, foundry tradesperson, patternmaker, or special class electrical fitter, electrical mechanic, electrical fitter/mechanic, electrician, refrigeration mechanic and radio tradesperson

Pathways Information

Pathways into the qualification

While there is no qualification entry requirement, it is assumed that the learner is either already a tradesperson with access to structured on and off-the-job training, or is an apprentice under an Australian Apprenticeship arrangement where the mix of on and off-the-job training would be specified in the Training Plan associated with the Contract of Training between the employer and apprentice.

This qualification may be accessed by direct entry. Credit for relevant units of competency achieved should be granted towards this qualification for those who have completed MEM30205 Certificate III in Engineering - Mechanical Trade, MEM30305 Certificate III in Engineering - Fabrication Trade, MEM30405 Certificate III in Engineering - Electrical/Electronic Trade, MEM30605 Certificate III in Jewellery Manufacture, MEM30705 Certificate III in Marine Craft Construction, MEM30805 Certificate III in Locksmithing, MEM31010 Certificate III in Watch and Clock Service and Repair, or other relevant qualifications.

Pathways from the qualification

Further training pathways from this qualification include MEM50105 Diploma of Engineering - Advanced Trade or other relevant qualifications.

Additional qualification advice

An additional descriptor may be added to this qualification title to illustrate a particular skills profile.

This could be achieved by adding a pathway descriptor or sentence below the formal title of the qualification. Note that no changes may be made to the qualification title and the use of one of these descriptors to a qualification does not change the qualification's formal title or unique national code.

There are no specific requirements associated with the use of these descriptors other than their use should reflect the nature of the choice of units of competency in the qualification and must be consistent with the work role of a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson - Level II.

Reference to other occupational or functional pathways consistent with the role of a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson - Level II may be included on any qualification statement that is issued.

Competitive Manufacturing qualifications are available for employees at this level who already possess trade and other technical skills and who require additional manufacturing practice skills above those available in this qualification.

Licensing considerations
If appropriate electives are undertaken as part of a contract of training recognised by licensing authorities, then this qualification can be used as the basis for an application in each state and territory for a license to practise as an electrician. It can also be used to satisfy regulations regarding refrigeration and air conditioning work. Local regulations should be checked for details.

Licensing/Regulatory Information

Refer to Pathways Information

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify trade related information • Provide clear and precise information to others including trade team members, apprentices, production employees • Recognise and use common engineering terminology and symbols • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a trade team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use advanced measuring techniques • Inspect quality of own or other employee's work • Assess operation and condition of equipment against specifications or manufacturer's requirements • Analyse information from drawings, production data, manuals and reports from other employees to improve equipment performance • Use diagnostic skills and tests to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes • Develop, implement and evaluate solutions to problems • Translate designs into practical outcomes
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	developments that occur as work progresses • Participate in improvement procedures including process, quality and internal/external customer/supplier relationships • Economise material and energy use and minimise waste
Planning and organising	• Plan, prioritise and sequence maintenance and repair operations to ensure completion of activities within schedules and with minimal disruption to scheduled production • Plan allocation of work to others including apprentices, trades assistants to ensure efficiency and safety • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental and other legislative requirements • Monitor performance of own and other's work to ensure customer satisfaction, efficiency and sustainability • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify internal or external customer requirements with respect to the work to be performed • Assess and modify own work practices • Use workshop and equipment manuals, online help, and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, environmental and other codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select, set up and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring and testing devices to ensure compliance with tolerances and other specifications • Navigate technology to access /input /store/retrieve/save and

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, diagnostic methods, tools and equipment to achieve the required outcome • Check equipment and instruments for accuracy • Improve efficiency of machines and equipment in order to minimise waste

Packaging Rules

The minimum requirements for achievement of the Certificate IV in Engineering are:

- completion of all core units of competency listed below, and
- completion of units from the Group A Specialisation electives listed below to the value of at least 12 points, and
- completion of Group B electives listed below to bring the total value to at least 109 points.

Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2, Volume 1).
Appropriate Group B elective units to the value of 22 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate IV. Note that the elective units listed below include all of the units that are approved for selection from the MEM Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Additional qualification descriptors
The following additional descriptors are approved for use with this qualification:
Refrigeration and Air Conditioning; Casting and Moulding; CNC programming; Fluid Power; Heavy Fabrication; Instrumentation; Maintenance; Marine Electronics; Mechatronics; Patternmaking; Robotics; Toolmaking; Welding, Watch and Clock Service and Repair.

Core Units

- select all of the units from this list

Unit code	Unit title

Unit code	Unit title
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15024A	Apply quality procedures
MEM15002A	Apply quality systems
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Electives

Group A- Specialisation units

- select units from this list to a value of at least 12 points and up to a maximum of 109 points

Unit code	Unit title	P
MEM04020A	Supervise individual ferrous melting and casting operation	4
MEM04021A	Supervise individual non ferrous melting and casting operation	4
MEM04022A	Examine appropriateness of	4

Unit code	Unit title	P
	methoding for mould design	
MEM04023A	Undertake prescribed tests on foundry related materials	4
MEM05024B	Perform welding supervision	12
MEM05025C	Perform welding/fabrication inspection	12
MEM05026C	Apply welding principles	4
MEM05042B	Perform welds to code standards using flux core arc welding process	6
MEM05043B	Perform welds to code standards using gas metal arc welding process	6
MEM05044B	Perform welds to code standards using gas tungsten arc welding process	6
MEM05045B	Perform pipe welds to code standards using manual metal arc welding process	6
MEM05046B	Perform welds to code standards using manual metal arc welding process	6
MEM05053A	Set and edit computer controlled thermal cutting machines	4
MEM05054A	Write basic NC/CNC programs for thermal cutting machines	4
MEM07016C	Set and edit computer controlled machines/processes	4
MEM07018C	Write basic NC/CNC programs	4

Unit code	Unit title	P
MEM07019C	Program NC/CNC machining centre	2
MEM07020C	Program multiple spindle and/or multiple axis NC/CNC machining centre	2
MEM07022C	Program CNC wire cut machines	2
MEM07023C	Program and set up CNC manufacturing cell	6
MEM07039A	Write programs for industrial robots	4
MEM09004B	Perform electrical/electronic detail drafting	8
MEM09006B	Perform advanced engineering detail drafting	4
MEM09007B	Perform advanced mechanical detail drafting	4
MEM09008B	Perform advanced structural detail drafting	4
MEM09009C	Create 2D drawings using computer aided design system	8
MEM09010C	Create 3D models using computer aided design system	4
MEM09023A	Create 3D code files using computer aided manufacturing system	6
MEM10007C	Modify control systems	6
MEM10008B	Undertake commissioning procedures for plant and/or equipment	4

Unit code	Unit title	P
MEM12003B	Perform precision mechanical measurement	2
MEM12004B	Perform precision electrical/electronic measurement	4
MEM12005B	Calibrate measuring equipment	6
MEM12025A	Use graphical techniques and perform simple statistical computations	2
MEM14001B	Schedule material deliveries	8
MEM14002B	Undertake basic process planning	8
MEM14003B	Undertake basic production scheduling	8
MEM15007B	Conduct product and/or process capability studies	6
MEM15008B	Perform advanced statistical quality control	2
MEM15010B	Perform laboratory procedures	8
MEM15011B	Exercise external quality assurance	6
MEM15012B	Maintain/supervise application of quality procedures	4
MEM15015B	Examine trading practices	5
MEM15016B	Inspect pre-packed articles	8
MEM15017B	Use and maintain reference standards	3
MEM15018B	Investigate consumer complaints	6

Unit code	Unit title	P
MEM15019B	Conduct a field inspection	12
MEM15020C	Perform verification/certification or in-service inspection	12
MEM15021C	Conduct audits of servicing licensees and public weighbridge licensees	4
MEM15022B	Verify reference standards	8
MEM16001B	Give formal presentations and take part in meetings	2
MEM16003B	Provide advanced customer service	2
MEM16009A	Research and analyse engineering information	2
MEM16010A	Write reports	2
MEM16011A	Communicate with individuals and small groups	2
MEM16012A	Interpret technical specifications and manuals	4
MEM16013A	Operate in a self-directed team	2
MEM16014A	Report technical information	2
MEM17001B	Assist in development and deliver training in the workplace	2
MEM17002B	Conduct workplace assessment	2
MEM18010C	Perform equipment condition monitoring and recording	4
MEM18011C	Shut down and isolate machines/equipment	2

Unit code	Unit title	P
MEM18016B	Analyse plant and equipment condition monitoring results	4
MEM18017C	Modify mechanical systems and equipment	8
MEM18019B	Maintain pneumatic systems	4
MEM18021B	Maintain hydraulic systems	4
MEM18022B	Maintain fluid power controls	8
MEM18023B	Modify fluid power system operation	8
MEM18049C	Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.	3
MEM18050C	Disconnect/reconnect fixed wired equipment over 1000 volts a.c./1500 volts d.c.	3
MEM18051B	Fault find and repair/rectify complex electrical circuits	6
MEM18053B	Modify fluid power control systems	6
MEM18054B	Fault find, test and calibrate instrumentation systems and equipment	8
MEM18056B	Diagnose and repair analog equipment and components	10
MEM18058C	Modify electronic equipment	4
MEM18059B	Modify electronic systems	4
MEM18060B	Maintain, repair control instrumentation - single and	8

Unit code	Unit title	P
	multiple loop control systems	
MEM18061B	Maintain/calibrate complex control systems	8
MEM18062B	Install, maintain and calibrate instrumentation sensors, transmitters and final control elements	8
MEM18065B	Diagnose and repair digital equipment and components	10
MEM18066B	Diagnose and repair microprocessor-based equipment	6
MEM18067B	Tune control loops - multi controller or multi element systems	6
MEM18069B	Maintain, repair instrumentation process control analysers	6
MEM18070C	Modify complex electrical circuits and systems	6
MEM18073A	Perform advanced equipment testing and diagnostics on mobile plant and equipment	8
MEM18091B	Maintain and repair multi stage, cascade and/or ultra-cold industrial refrigeration systems	4
MEM18092B	Maintain and repair commercial and/or industrial refrigeration and/or air conditioning controls	6
MEM18093B	Maintain and repair integrated industrial refrigeration and/or large air handling system controls	8

Unit code	Unit title	P
MEM18098A	Prepare to perform work associated with fuel system installation and servicing*	2
MEM19008B	Prepare jewellery designs	6
MEM19013B	Produce jewellery metal masters	4
MEM19018B	Repair jewellery items	6
MEM19022B	Perform precision micro-mechanism diagnosis and servicing	6
MEM20008A	Develop and implement a masterkey system	6
MEM20011A	Service and repair fire and security containers	6
MEM20012A	Service and repair mechanical automotive locking systems	4
MEM20013A	Service automotive transponder systems	2
MEM21018A	Service clock escapements and oscillating systems	4
MEM21019A	Service and repair clock striking mechanisms	4
MEM21020A	Service and repair clock chiming mechanisms	6
MEM21021A	Restore clockwork mechanisms	6
MEM21022A	Manufacture watch and clock components	6
MEM21023A	Plan, set up and operate horological workshop or service	4

Unit code	Unit title	P
	centre	
MEM24002B	Perform penetrant testing	4
MEM24004B	Perform magnetic particle testing	4
MEM24006B	Perform eddy current testing	6
MEM24008B	Perform ultrasonic testing	6
MEM24010B	Perform radiographic testing	6
MEM24011B	Establish non-destructive tests	12
MEM24012C	Apply metallurgy principles	4
MEM25008B	Repair marine vessel surfaces and structures	4
MEM25013B	Produce three-dimensional plugs/moulds	12
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment	4
MEM30025A	Analyse a simple electrical system circuit	4
MSATCM304A	Interpret binary phase diagrams	4

Group B - elective units

- select units from this group to bring the total value of Group A and B units to 109 points, including any prerequisites.

Unit code	Unit title	P
AURVTN2002	Carry out panel repairs	4
BSBOHS502A	Participate in the management of the OHS information and data	2

Unit code	Unit title	P
	systems	
BSBOHS601A	Develop a systematic approach to managing OHS	4
BSBOHS602A	Develop OHS information and data analysis and reporting and recording processes	2
BSBOHS603A	Analyse and evaluate OHS risk	4
ICTTC136B	Install, maintain and modify customer premises communications cabling: ACA Restricted Rule	6
ICTTC137B	Install, maintain and modify customer premises communications cabling: ACA Open Rule	6
MEA405A	Repair/modify aircraft composite material structure/components	4
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly	4
MEM03003B	Perform sheet and plate assembly	4
MEM03004B	Perform electronic/electrical assembly (production)	8
MEM03005B	Rework and repair (electrical/electronic production)	8
MEM03006B	Set assembly stations	2
MEM04001B	Operate melting furnaces	4
MEM04002B	Perform gravity die casting	2
MEM04003B	Operate pressure die casting	4

Unit code	Unit title	P
	machine	
MEM04004B	Prepare and mix sand for metal moulding	4
MEM04005C	Produce moulds and cores by hand (jobbing)	16
MEM04006B	Operate sand moulding and core making machines	8
MEM04007B	Pour molten metal	4
MEM04008B	Fettle and trim metal castings/forgings	4
MEM04010B	Develop and manufacture wood patterns	20
MEM04011B	Produce polymer patterns	8
MEM04012B	Assemble plated patterns	8
MEM04013B	Develop and manufacture polystyrene patterns	2
MEM04014B	Develop and manufacture production patterns	8
MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment	6
MEM04016C	Develop and manufacture precision models	6
MEM04017B	Develop and manufacture gear, conveyor screw and propeller patterns	4
MEM04018B	Perform general woodworking machine operations	4

Unit code	Unit title	P
MEM04019B	Perform refractory installation and repair	4
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering and desoldering	4
MEM05003B	Perform soft soldering	2
MEM05004C	Perform routine oxy acetylene welding	2
MEM05005B	Carry out mechanical cutting	2
MEM05006C	Perform brazing and/or silver soldering	2
MEM05007C	Perform manual heating and thermal cutting	2
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping	2
MEM05009C	Perform automated thermal cutting	2
MEM05010C	Apply fabrication, forming and shaping techniques	8
MEM05011D	Assemble fabricated components	8
MEM05012C	Perform routine manual metal arc welding	2
MEM05013C	Perform manual production welding	2
MEM05014C	Monitor quality of production welding/fabrications	2

Unit code	Unit title	P
MEM05015D	Weld using manual metal arc welding process	4
MEM05016C	Perform advanced welding using manual metal arc welding process	4
MEM05017D	Weld using gas metal arc welding process	4
MEM05018C	Perform advanced welding using gas metal arc welding process	4
MEM05019D	Weld using gas tungsten arc welding process	4
MEM05020C	Perform advanced welding using gas tungsten arc welding process	4
MEM05022C	Perform advanced welding using oxy acetylene welding process	6
MEM05023C	Weld using submerged arc welding process	4
MEM05036C	Repair/replace/modify fabrications	4
MEM05037C	Perform geometric development	6
MEM05038B	Perform advanced geometric development - cylindrical/rectangular	2
MEM05039B	Perform advanced geometric development - conical	2
MEM05040B	Perform advanced geometric development - transitions	4
MEM05041B	Weld using powder flame spraying	4
MEM05047B	Weld using flux core arc welding process	4

Unit code	Unit title	P
MEM05048B	Perform advanced welding using flux core arc welding process	4
MEM05049B	Perform routine gas tungsten arc welding	2
MEM05050B	Perform routine gas metal arc welding	2
MEM05051A	Select welding processes	2
MEM05052A	Apply safe welding practices	4
MEM06001B	Perform hand forging	4
MEM06002B	Perform hammer forging	4
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6
MEM06005B	Perform drop and upset forging	4
MEM06006C	Repair springs	4
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM06008A	Hammer forge complex shapes	4
MEM06009A	Hand forge complex shapes	4
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07002B	Perform precision shaping/planing/slotting operations	4
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8

Unit code	Unit title	P
MEM07005C	Perform general machining	8
MEM07006C	Perform lathe operations	4
MEM07007C	Perform milling operations	4
MEM07008D	Perform grinding operations	4
MEM07009B	Perform precision jig boring operations	4
MEM07010B	Perform tool and cutter grinding operations	4
MEM07011B	Perform complex milling operations	4
MEM07012B	Perform complex grinding operations	4
MEM07013B	Perform machining operations using horizontal and/or vertical boring machines	4
MEM07014B	Perform electro-discharge (EDM) machining operations	4
MEM07015B	Set computer controlled machines/processes	2
MEM07021B	Perform complex lathe operations	4
MEM07024B	Operate and monitor machine/process	4
MEM07025B	Perform advanced machine/process operation	
MEM07026B	Perform advanced plastic processing	6
MEM07027B	Perform advanced press operations	6

Unit code	Unit title	P
MEM07028B	Operate computer controlled machines/processes	2
MEM07029B	Perform routine sharpening/maintenance of production tools and cutters	4
MEM07030C	Perform metal spinning lathe operations (basic)	8
MEM07031C	Perform metal spinning lathe operations (complex)	4
MEM07032B	Use workshop machines for basic operations	2
MEM07033B	Operate and monitor basic boiler	6
MEM07034A	Operate and monitor intermediate class boiler	4
MEM07040A	Set multistage integrated processes	6
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2
MEM08007B	Control surface finish production	4

Unit code	Unit title	P
	and finished product quality	
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6
MEM08019B	Electroplate protective finishes	6
MEM08020B	Electroplate decorative finishes	6
MEM09002B	Interpret technical drawing	4
MEM09003B	Prepare basic engineering drawing	8
MEM09005B	Perform basic engineering detail drafting	8
MEM09011B	Apply basic engineering design concepts	6
MEM09021B	Interpret and produce curved 3-	4

Unit code	Unit title	P
	dimensional shapes	
MEM09022A	Create 2D code files using computer aided manufacturing system	4
MEM10001C	Erect structures	4
MEM10002B	Terminate and connect electrical wiring	3
MEM10003B	Install and test electrical wiring and circuits up to 1000 volts a.c. and 1500 volts d.c.	12
MEM10004B	Enter and change programmable controller operational parameters	2
MEM10005B	Commission programmable controller programs	4
MEM10006B	Install machine/plant	4
MEM10009B	Install refrigeration and air conditioning plant and equipment	4
MEM10010B	Install pipework and pipework assemblies	4
MEM10011B	Terminate and connect specialist cables	3
MEM10013A	Install split air conditioning systems and associated pipework	6
MEM11001C	Erect/dismantle scaffolding and equipment	4
MEM11002C	Erect/dismantle complex scaffolding and equipment	4
MEM11003B	Coordinate erection/dismantling of	4

Unit code	Unit title	P
	complex scaffolding/equipment	
MEM11004B	Undertake dogging	4
MEM11005B	Pick and process order	4
MEM11006B	Perform production packaging	2
MEM11007B	Administer inventory procedures	4
MEM11008B	Package materials (stores and warehouse)	2
MEM11009B	Handle/move bulk fluids/gases	4
MEM11010B	Operate mobile load shifting equipment	4
MEM11011B	Undertake manual handling	2
MEM11012B	Purchase materials	6
MEM11013B	Undertake warehouse receival process	4
MEM11014B	Undertake warehouse dispatch process	4
MEM11015B	Manage warehouse inventory system	6
MEM11016B	Order materials	2
MEM11017B	Organise and lead stocktakes	4
MEM11018B	Organise and maintain warehouse stock receival and/or dispatch system	6
MEM11019B	Undertake tool store procedures	4
MEM11020B	Perform advanced warehouse computer operations	4

Unit code	Unit title	P
MEM11021B	Perform advanced operation of load shifting equipment	2
MEM11022B	Operate fixed/moveable load shifting equipment	4
MEM12001B	Use comparison and basic measuring devices	2
MEM12002B	Perform electrical/electronic measurement	2
MEM12006C	Mark off/out (general engineering)	4
MEM12007D	Mark off/out structural fabrications and shapes	4
MEM12019B	Measure components using coordinate measuring machine	4
MEM12020B	Set and operate coordinate measuring machine	2
MEM12021B	Program coordinate measuring machine	4
MEM12022B	Program coordinate measuring machine (advanced)	2
MEM13001B	Perform emergency first aid	1
MEM13002B	Undertake occupational health and safety activities in the workplace	3
MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM13006B	Collect and evaluate occupational health and safety data for an	4

Unit code	Unit title	P
	enterprise or section of an enterprise	
MEM13007B	Maintain water treatment systems for cooling towers	2
MEM13010A	Supervise occupational health and safety in an industrial work environment.	4
MEM13013B	Work safely with ionizing radiation	4
MEM15001B	Perform basic statistical quality control	2
MEM15003B	Use improvement processes in team activities	4
MEM15004B	Perform inspection	2
MEM15005B	Select and control inspection processes and procedures	4
MEM16002C	Conduct formal interviews and negotiations	4
MEM16004B	Perform internal/external customer service	2
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work	4
MEM18004B	Maintain and overhaul mechanical equipment	4

Unit code	Unit title	P
MEM18005B	Perform fault diagnosis, installation and removal of bearings	4
MEM18006C	Repair and fit engineering components	6
MEM18007B	Maintain and repair mechanical drives and mechanical transmission assemblies	4
MEM18008B	Balance equipment	2
MEM18009B	Perform levelling and alignment of machines and engineering components	4
MEM18012B	Perform installation and removal of mechanical seals	2
MEM18013B	Perform gland packing	2
MEM18014B	Manufacture press tools and gauges	8
MEM18015B	Maintain tools and dies	4
MEM18018C	Maintain pneumatic system components	4
MEM18020B	Maintain hydraulic system components	4
MEM18024B	Maintain engine cooling systems	2
MEM18025B	Service combustion engines	2
MEM18026C	Test compression ignition fuel systems	4
MEM18027C	Overhaul engine fuel system components	8
MEM18028B	Maintain engine lubrication	2

Unit code	Unit title	P
	systems	
MEM18029B	Tune diesel engines	4
MEM18030B	Diagnose and rectify low voltage electrical systems	8
MEM18031B	Diagnose and rectify low voltage starting systems	2
MEM18032B	Maintain induction/exhaust systems	4
MEM18033B	Perform engine bottom-end overhaul	4
MEM18034B	Perform engine top-end overhaul	8
MEM18035B	Diagnose and rectify braking systems	6
MEM18037B	Diagnose and rectify low voltage charging systems	2
MEM18038B	Maintain wheels and tyres	2
MEM18039B	Diagnose and rectify track type undercarriage	4
MEM18040B	Maintain suspension systems	4
MEM18041B	Maintain steering systems	4
MEM18042C	Diagnose and rectify manual transmissions	4
MEM18043C	Diagnose and rectify automatic transmissions	8
MEM18044C	Diagnose and rectify drive line and final drives	4
MEM18045B	Fault find/repair electrical equipment/components up to 250	4

Unit code	Unit title	P
	volts single phase supply	
MEM18046B	Fault find/repair electrical equipment/components up to 1000 volts a.c./1500 volts d.c.	10
MEM18047B	Diagnose and maintain electronic controlling systems on mobile plant	4
MEM18048B	Fault find and repair/rectify basic electrical circuits	12
MEM18052B	Maintain fluid power systems for mobile plant	4
MEM18055B	Dismantle, replace and assemble engineering components	3
MEM18057B	Maintain/service analog/digital electronic equipment	6
MEM18063B	Terminate signal and data cables	4
MEM18064B	Maintain instrumentation system components	6
MEM18071B	Connect/disconnect fluid conveying system components	2
MEM18072B	Manufacture fluid conveying conductor assemblies	4
MEM18084A	Commission and decommission split air conditioning systems	4
MEM18085A	Install, service and repair domestic air conditioning and refrigeration appliances	6
MEM18086B	Test, recover, evacuate and charge refrigeration systems	4

Unit code	Unit title	P
MEM18087B	Service and repair domestic and light commercial refrigeration and air conditioning equipment	6
MEM18088B	Maintain and repair commercial air conditioning systems and components	4
MEM18089B	Maintain and repair central air handling systems	6
MEM18090B	Maintain and repair industrial refrigeration systems and components	6
MEM18094B	Service and repair commercial refrigeration	6
MEM18095A	Maintain and repair cooling towers/evaporative condensers and associated equipment	4
MEM18096A	Maintain, repair/replace and adjust refrigerant flow controls and associated equipment	6
MEM18097A	Manufacture cavity dies	8
MEM19001B	Perform jewellery metal casting	6
MEM19002B	Prepare jewellery illustrations	4
MEM19003B	Handle gem materials	2
MEM19004B	Handle and examine gemstone materials	6
MEM19005B	Produce three-dimensional precision items	8
MEM19006B	Replace watch batteries	1

Unit code	Unit title	P
MEM19007B	Perform gemstone setting	6
MEM19009B	Perform investment procedures for lost wax casting process	1
MEM19010B	Produce rubber moulds for lost wax casting process	2
MEM19011B	Perform wax injection of moulds for lost wax casting process	2
MEM19012B	Produce jewellery wax model	4
MEM19014B	Perform hand engraving	4
MEM19015B	Perform jewellery enamelling	4
MEM19016B	Construct jewellery components	4
MEM19017B	Fabricate jewellery items	6
MEM19020B	Fault-find and maintain micro-mechanisms	4
MEM19021B	Diagnose and service micro-mechanisms	6
MEM20001A	Produce keys	4
MEM20002A	Assemble and test lock mechanisms	6
MEM20003A	Install and upgrade locks and hardware	4
MEM20004A	Gain entry	4
MEM20005A	Install and maintain door control devices/systems	2
MEM20006A	Maintain and service mechanical locking devices	6
MEM20007A	Plan and prepare a masterkey	4

Unit code	Unit title	P
	system	
MEM20009A	Gain entry and reinstate fire and security containers	4
MEM20010A	Gain entry and reinstate automotive locking systems	4
MEM20014A	Perform a site security survey	2
MEM21001A	Replace watch batteries, capacitors and bands	2
MEM21002A	Perform watch movement exchange *	2
MEM21003A	Perform watch case servicing, repair and refurbishment *	4
MEM21004A	Clean watch and clock components	2
MEM21005A	Diagnose faults in quartz watches *	2
MEM21006A	Service quartz watches *	4
MEM21007A	Service complex quartz watches	4
MEM21008A	Service mechanical watches	4
MEM21009A	Inspect, diagnose, adjust and repair mechanical watches	4
MEM21010A	Service watch power generating systems	2
MEM21011A	Service calendar and other dial indication mechanisms for watches	4
MEM21012A	Service and repair mechanical watch oscillating systems	4
MEM21013A	Service, test and adjust watch escapements	4

Unit code	Unit title	P
MEM21014A	Service mechanical chronograph watches	6
MEM21015A	Perform precision watch timing and adjustment	6
MEM21016A	Install and set up clocks	2
MEM21017A	Service and repair clock timepieces	6
MEM24001B	Perform basic penetrant testing	2
MEM24003B	Perform basic magnetic particle testing	2
MEM24005B	Perform basic eddy current testing	2
MEM24007B	Perform ultrasonic thickness testing	2
MEM24009B	Perform basic radiographic testing	2
MEM25001B	Apply fibre-reinforced materials	2
MEM25002B	Form and integrate fibre-reinforced structures	4
MEM25003B	Set up marine vessel structures	4
MEM25004B	Fair and shape surfaces	2
MEM25005B	Construct and assemble marine vessel timber components	8
MEM25006B	Undertake marine sheathing operations	2
MEM25007B	Maintain marine vessel surfaces	4
MEM25009B	Form timber shapes using hot processes	2
MEM25010B	Perform fitout procedures	4

Unit code	Unit title	P
MEM25011B	Install marine systems	8
MEM25012B	Install and test operations of marine auxiliary systems	6
MEM25014B	Perform marine slipping operations	2
MEM25015A	Assemble and install equipment and accessories/ancillaries	2
MEM50002B	Work safely on marine craft	1
MEM50003B	Follow work procedures to maintain the marine environment	1
MEM50004B	Maintain quality of environment by following marina codes	1
MEM50009B	Safely operate a mechanically powered recreational boat	2
MSAENV472B	Implement and monitor environmentally sustainable work practices	4
PMBPROD291B	Operate resin infusion moulding equipment	2
PMBPROD294B	Operate resin transfer moulding equipment	2
PMBPROD298B	Operate equipment using pre-pregs material	2
PMBPROD391B	Produce composites using resin infusion	4
PMBPROD394B	Produce composites using resin transfer moulding	4
PMBPROD398B	Produce composites using pre-pregs	4

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

The minimum requirements for this qualification can also be met by holders of one of the following qualifications or equivalent with the completion of additional units of competency drawn from Specialisation units Group A to a minimum value of 12 points and Specialisation units from Group B to bring the total value of additional units to at least 36 points (note that additional units are those units not included in the Certificate III qualification already held):

- MEM30105 Certificate III in Engineering - Production Systems
- MEM30205 Certificate III in Engineering - Mechanical Trade
- MEM30305 Certificate III in Engineering - Fabrication Trade
- MEM30405 Certificate III in Engineering - Electrical/Electronic Trade
- MEM30605 Certificate III in Jewellery Manufacture
- MEM30705 Certificate III in Marine Craft Construction
- MEM30805 Certificate III in Locksmithing
- MEM31010 Certificate III in Watch and Clock Service and Repair
- AUR30505 Certificate III in Marine
-

MEM40205 Certificate IV in Boating Services

Modification History

Release 2 - Title corrected for unit MEM05003B Perform soft soldering

Description

Not Applicable

Pathways Information

Not Applicable

Licensing/Regulatory Information

Not Applicable

Entry Requirements

Not Applicable

Employability Skills Summary

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
Employability Skill	**Industry/enterprise requirements for this qualification include**:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts and maps, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify boating related information • Provide clear and precise information to others including team members, customers and service personnel • Recognise and use common marine terminology and symbols • Liaise with appropriate authorities
Teamwork	• Work alone or lead or work as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem-solving	• Undertake numerical operations, calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages) • Use measuring techniques • Inspect quality of own or other employee's work • Assess operation and condition of equipment against specifications or manufacturer's requirements • Analyse information from drawings, charts and maps, manuals and reports from other employees to improve service to customers • Develop, implement and evaluate solutions to problems
Initiative and enterprise	• Be capable of applying skills in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses • Participate in improvement procedures including activities to improve services, work processes, environmental impacts, quality and internal/external customer/supplier relationships

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	• Economise material and energy use and minimise waste
Planning and organising	• Plan, prioritise and sequence maintenance and repair operations to ensure completion of activities within schedules and with minimal disruption to scheduled production • Plan allocation of work to others including apprentices, trades assistants to ensure efficiency and safety • Organise and analyse information relevant to work • Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental and other legislative requirements • Monitor performance of own and other's work to ensure customer satisfaction, efficiency and sustainability • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.
Learning	• Check and clarify task related information with appropriate personnel or technical adviser • Identify internal or external customer requirements with respect to the work to be performed • Assess and modify own work practices • Use workshop and equipment manuals, online help, and other reference materials such as catalogues/lists as required • Maintain current knowledge of applicable standards, legislation, environmental and other codes of practice and product/process developments • Assist with on the job training and assessment
Technology	• Select, set up and use appropriate tools, equipment, materials and machines • Select and use appropriate measuring and testing devices to ensure compliance with specifications • Navigate technology to access , input, store, retrieve, save and produce information using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, diagnostic methods, tools and

EMPLOYABILITY SKILLS QUALIFICATION SUMMARY	
	equipment to achieve the required outcome • Check equipment and instruments for faults and pefformance to specification • Improve efficiency of machines and equipment in order to minimise waste

Packaging Rules

The minimum requirements for achievement of the Certificate IV in Boating Services are:

- completion of ten (10) core units of competency listed below, and
- completion of nineteen (19) elective units from Groups A, B and C as described below to bring the total number of units to twenty nine (29).

Note that when selecting elective units any prerequisite units must also be completed and count towards the required number of elective units (refer to units for details).
Up to five appropriate elective units of competency may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate IV. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the NSSC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.
Only select units that would be suitable for occupational outcomes in a marine environment.

Additional qualification descriptors
There are no approved additional descriptors for this qualification.

Core Units

- select all of the units from this list

Unit code	Unit title
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information

Unit code	Unit title
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM50001B	Classify recreational boating technologies and features
MEM50002B	Work safely on marine craft
MEM50003B	Follow work procedures to maintain the marine environment
MEM50004B	Maintain quality of environment by following marina codes
MSAENV272B	Participate in environmentally sustainable work practices

Elective units

Group A

- select at least one unit from this list

Unit code	Unit title
MEM50005B	Refuel vessels
MEM50006B	Check operational capability of marine craft
MEM50007B	Check operational capability of sails and sail operating equipment
MEM50008B	Carry out trip preparation and planning
MEM50009B	Safely operate a mechanically powered recreational boat
MEM50010B	Respond to boating emergencies and incidents

Group B

- select at least five units from this list

Unit code	Unit title

Unit code	Unit title
BSBCMN408A	Report on financial activity
BSBRKG301A	Control records
BSALF401A	Maintain trust accounts
BSBADM402A	Produce complex business documents
BSBCMN406A	Maintain business technology
BSBADM408A	Prepare financial reports
Any units from BSB40807 Certificate IV in Frontline Management may be selected. These units are not listed in this Volume. Please refer to the relevant host training package.	
Any units from TAE40110 Certificate IV in Training and Assessment. These units are not listed in this Volume. Please refer to the relevant host training package.	

Group C

- select the balance of units from this list.

Unit code	Unit title
MEM04018B	Perform general woodworking machine operations
MEM05003B	Perform soft soldering
MEM05005B	Carry out mechanical cutting
MEM05007C	Perform manual heating and thermal cutting
MEM05012C	Perform routine manual metal arc welding
MEM05050B	Perform routine gas metal arc welding
MEM09002B	Interpret technical drawing
MEM11010B	Operate mobile load shifting equipment
MEM11011B	Undertake manual handling

Unit code	Unit title
MEM12023A	Perform engineering measurements
MEM12006C	Mark off/out (general engineering)
MEM12007D	Mark off/out structural fabrications and shapes
MEM13003B	Work safely with industrial chemicals and materials
MEM18001C	Use hand tools
MEM18002B	Use power tools/hand held operations
MEM25001B	Apply fibre-reinforced materials
MEM25004B	Fair and shape surfaces
MEM25007B	Maintain marine vessel surfaces
MEM50005B	Refuel vessels
MEM50006B	Check operational capability of marine craft
MEM50007B	Check operational capability of sails and sail operating equipment
MEM50008B	Carry out trip preparation and planning
MEM50009B	Safely operate a mechanically powered recreational boat
MEM50010B	Respond to boating emergencies and incidents
MSAENV472B	Implement and monitor environmentally sustainable work practices

The minimum requirements for this qualification can also be met by holders of one of the following qualifications or equivalent subject to the completion of at least one additional Core unit of competency and seven additional Group A and Group B elective units of competency as specified below (note that additional units are those units not included in the Certificate III qualification already held):

- MEM30705 Certificate III in Marine Craft Construction
- MEM30905 Certificate III in Boating Services
- AUR30505 Certificate III in Marine
- LMT30407 Certificate III in Textile Fabrication

Core Units

- select this unit

Unit code	Unit title
MEM50001B	Classify recreational boating technologies and features

Elective units

Group A

- select one unit from this list

Unit code	Unit title
MEM50002B	Work safely on marine craft
MEM50003B	Follow work procedures to maintain the marine environment
MEM50004B	Maintain quality of environment by following marina codes
MEM50005B	Refuel vessels
MEM50006B	Check operational capability of marine craft
MEM50007B	Check operational capability of sails and sail operating equipment
MEM50008B	Carry out trip preparation and planning
MEM50009B	Safely operate a mechanically powered recreational boat
MEM50010B	Respond to boating emergencies and incidents

Group B

- select six units from this list.

Unit code	Unit title

Unit code	Unit title
BSBCMN408A	Report on financial activity
BSBRKG301A	Control records
BSALF401A	Maintain trust accounts
BSBADM402A	Produce complex business documents
BSBCMN406A	Maintain business technology
BSBADM408A	Prepare financial reports
Any units from BSB40807 Certificate IV in Frontline Management. These units are not listed in this Volume. Please refer to the relevant host training package.	
Any units from TAE40110 Certificate IV in Training and Assessment. These units are not listed in this Volume. Please refer to the relevant host training package.	

MEM40311 Certificate IV in Advanced Jewellery Manufacture

Modification History

Release 2 - Imported elective unit BSBSMB405A replaced by BSBSMB405B. No change in outcomes.
Release 1 - New qualification

Description

This qualification has been specifically developed to be delivered to people who are existing jewellery tradespersons or apprentices in a jewellery-related trade who choose to study at a higher level during their apprenticeship. The qualification packaging has been developed on an assumption that competency will be developed through a combination of on and off the job learning strategies. The qualification may also be achieved through formal skills recognition processes.

Job roles/employment outcomes

The MEM40311 Certificate IV in Advanced Jewellery Manufacture specifies the competencies required for employment as a Higher Engineering Tradesperson or a Special Class Engineering Tradesperson – Level II in jewellery-related disciplines, Jeweller Tradesperson Special Class, or related classification depending on the Award or Agreement.

The job role involves application of additional skills in the jewellery trade including, gem setting, engraving or jewellery manufacturing skills. Employment outcomes related to this qualification are found in jewellery manufacturing and retail and wholesale jewellery enterprises.

Application

This qualification is typically used to develop skill and knowledge in the application of specialised jewellery manufacturing trade and related skills within jewellery-related enterprises.

Pathways Information

Pathways into the qualification

This qualification may be accessed by direct entry. Credit for relevant units of competency

should be granted towards this qualification for those who have completed MEM30605 Certificate III in Jewellery Manufacture, other relevant qualifications or achieved equivalent industry experience.

Pathways from the qualification

Further training pathways from this qualification include design orientated training in the Diploma and Advanced Diploma in Jewellery and Object Design or management qualifications.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification. However, some units in this qualification may have licensing or regulatory requirements in some environments. Local regulations should be checked for details.

Entry Requirements

Not applicable.

Employability Skills Summary

Certificate IV in Advanced Jewellery Manufacturing

The following table contains a summary of the Employability Skills as identified by the jewellery 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	• Establish and maintain effective relationships with industry representatives and clients • Interpret industry standards, regulations and policies • Undertake client discussion to determine work requirements and job specifications • Consult with supply chain personnel to determine resource supply capabilities • Calculate job costs • Negotiate with client to establish costing and job timeframes • Sketch designs • Accurately record and interpret detailed work specifications • Complete detailed and accurate documentation and maintain records
Teamwork	• Establish and maintain cooperative and consultative relationships with clients or colleagues • Work with others in the supply chain • Provide information and feedback to others to maintain production quality • Participate in sustainability improvements
Problem-solving	• Examine risks and implement and maintain risk control measures for materials and equipment • Identify and report environmental features, regulations, insurance requirements, legal requirements and other factors which may affect the product or service to be provided • Determine and implement corrective measures for production problems and faults • Undertake maintenance of machinery and equipment

	• Determine work requirements and modifications • Assess quality of materials before using in work items • Produce cost-effective specifications in line with client expectations • Determine specific construction techniques to be used • Respond effectively to supply chain issues related to supply of resources • Investigate environmental performance and identify potential areas for improvement
Initiative and enterprise	• Develop continuous improvement of processes • Determine necessary adjustment to production techniques in line with specifications • Anticipate and address design and production issues • Investigate and apply new tools and strategies to improve resource use
Planning and organising	• Undertake effective planning of own work to achieve desired outcomes within agreed timeframes • Undertake ordering of resources and materials to ensure work flows are met • Monitor quality processes and analyse outcomes • Determine and implement contingency plans to respond to incidents and problems • Monitor and maintain equipment condition and performance
Self-management	• Manage own work plans and priorities • Manage client and industry relationships and contracts • Manage data flows and record keeping • Maintain housekeeping of workplace • Monitor and maintain own work against quality standards • Apply safety procedures, including the use of protective equipment • Monitor use of resources
Learning	• Assess own skill requirements and seek further development, if required • Develop or adjust own processes based on prior experience • Maintain currency of learning with regards to trends, jewellery design features and production techniques • Experiment with production techniques

Technology	• Monitor and maintain machine operation • Use machinery and equipment effectively, efficiently and safely • Use specialised computing equipment and software

Packaging Rules

The minimum requirements for achievement of the MEM40311 Certificate IV in Advanced Jewellery Manufacture are:

- completion of all twelve (12) core units of competency listed below, and
- completion of elective units as described below from Groups A and B, to bring the total value to at least 109 points.

Elective units are to be chosen as follows:

- completion of Group A electives to the value of at least 12 points
- completion of Group B electives to bring the total value of elective units to 109 points.

Appropriate elective units to the value of 22 points may be chosen from other endorsed Training Packages and accredited courses where those units are available for inclusion at Certificate IV. Note that the elective units listed below include all of the units that are approved for selection from the MEM05 Training Package for use in this qualification. This meets the NQC requirement that one sixth of the total units must be able to be selected from other qualifications in the same Training Package.

Registered Training Organisations must seek a determination from Manufacturing Skills Australia in respect of the allocation of points values for units of competency drawn from other Training Packages or accredited courses.

Units with prerequisites are marked with an asterisk. Note that when selecting elective units any prerequisite units must also be completed. Points associated with prerequisites count towards the total (refer to units and prerequisites listing in Appendix 2).

Core units of competency

Complete all twelve (12) units of competency from this list.

Unit code	Unit title
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment
MEM14004A	Plan to undertake a routine task
MEM14005A	Plan a complete activity
MEM15002A	Apply quality systems
MEM15024A	Apply quality procedures
MEM16006A	Organise and communicate information
MEM16007A	Work with others in a manufacturing, engineering or related environment
MEM16008A	Interact with computing technology
MEM17003A	Assist in the provision of on the job training
MSAENV272B	Participate in environmentally sustainable work practices

Elective units of competency

Group A - Advanced Jewellery Specialisation units

Select units from this list to the value of at least 12 points and up to a maximum of 109 points.

Unit code	Unit title	Points
MEM19023A	Apply drawing and rendering techniques to jewellery or object design	4
MEM19024A	Use CAD to create and display 3D jewellery and object models	4
MEM19025A	Create and present designs for jewellery and other 3D objects	4
MEM19026A	Investigate quality and application of jewellery materials	2
MEM19028A	Select materials and new technologies for jewellery and 3D object design applications	2
MEM19031A	Produce renderings and technical drawings for jewellery and object design construction	2
MEM19033A	Create silversmithing objects	4
MEM19034A	Apply chain manufacture process	2
MEM19035A	Plan and apply casting techniques for jewellery and object designs	4
MEM19037A	Plan and implement chenier fabrication process	2
MEM19038A	Apply traditional techniques to jewellery and 3D object production	4
MEM19044A	Repair and restore antique jewellery	4
MEM19045A	Set gems in channel style settings	4
MEM19046A	Apply grain setting techniques	4
MEM19047A	Set gems in claw and bezel style settings	4
MEM19048A	Develop and apply complex borders and decorations for hand engraving	4
MEM19049A	Develop and apply heraldic designs for hand engraving	2
MEM19050A	Hand carve engraving work	4

MEM19051A	Construct multiple stone settings*	4
MEM19052A	Produce complex objects using silversmithing techniques*	4
MEM19053A	Create complex findings and mechanisms for jewellery items*	4
MEM19054A	Fabricate platinum jewellery items	4

Group B - Jewellery Manufacture stream units

Select units from this group to bring the total value of Group A and B units to 109 points, including any prerequisites.

Unit code	Unit title	Points
MEM03001B	Perform manual production assembly	4
MEM03002B	Perform precision assembly*	4
MEM03003B	Perform sheet and plate assembly*	4
MEM03004B	Perform electronic/electrical assembly (production)	8
MEM03006B	Set assembly stations*	2
MEM05006C	Perform brazing and/or silver soldering	2
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM07001B	Perform operational maintenance of machines/equipment*	2
MEM07005C	Perform general machining	8
MEM07024B	Operate and monitor machine/process	4
MEM07032B	Use workshop machines for basic operations*	2
MEM07040A	Set multistage integrated processes*	6
MEM08001B	Perform wire, jig and barrel load/unload work	4
MEM08002C	Pre-treat work for subsequent surface coating*	4
MEM08003C	Perform electroplating operations*	6
MEM08010B	Manually finish/polish materials*	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means*	2
MEM09002B	Interpret technical drawing	4
MEM13001B	Perform emergency first aid	1
MEM13002B	Undertake occupational health and safety activities in the workplace	3

MEM13003B	Work safely with industrial chemicals and materials	2
MEM13004B	Work safely with molten metals/glass	2
MEM13010A	Supervise occupational health and safety in an industrial work environment*	4
MEM15003B	Use improvement processes in team activities*	4
MEM15004B	Perform inspection	2
MEM15015B	Examine trading practices*	5
MEM16002C	Conduct formal interviews and negotiations	4
MEM16004B	Perform internal/external customer service	2
MEM16005A	Operate as a team member to conduct manufacturing, engineering or related activities	2
MEM16011A	Communicate with individuals and small groups*	2
MEM16013A	Operate in a self-directed team*	2
MEM17001B	Assist in development and deliver training in the workplace	2
MEM17002B	Conduct workplace assessment	2
MEM18001C	Use hand tools	2
MEM18002B	Use power tools/hand held operations	2
MEM18003C	Use tools for precision work*	4
MEM18055B	Dismantle, replace and assemble engineering components*	3
MEM19001B	Perform jewellery metal casting*	6
MEM19002B	Prepare jewellery illustrations*	4
MEM19003B	Handle gem materials	2
MEM19004B	Handle and examine gemstone materials*	6

MEM19005B	Produce three-dimensional precision items*	8
MEM19006B	Replace watch batteries*	1
MEM19007B	Perform gemstone setting*	6
MEM19008B	Prepare jewellery designs*	6
MEM19009B	Perform investment procedures for lost wax casting process*	1
MEM19010B	Produce rubber moulds for lost wax casting process	2
MEM19011B	Perform wax injection of moulds for lost wax casting process	2
MEM19012B	Produce jewellery wax model	4
MEM19013B	Produce jewellery metal masters*	4
MEM19014B	Perform hand engraving*	4
MEM19015B	Perform jewellery enamelling*	4
MEM19016B	Construct jewellery components*	4
MEM19017B	Fabricate jewellery items*	6
MEM19018B	Repair jewellery items*	6
MEM19020B	Fault-find and maintain micro-mechanisms*	4
MEM19021B	Diagnose and service micro-mechanisms*	6
MEM19022B	Perform precision micro-mechanism diagnosis and servicing	6
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment	4
BSBSMB403A	Market the small business	4
BSBSMB405B	Monitor and manage business operations	4
BSBSMB406A	Manage small business finances	4

Custom Content Section

Not applicable.

MEM40412 Certificate IV in Engineering Drafting

Modification History

Release 3 - Imported elective unit UEPMNT419A replaced by UEPMNT419B - no change in outcomes.
Release 2 - Competitive manufacturing (MSACM) units replaced by Competitive Systems and Practices units.
Release 1 - New qualification

Description

This qualification covers the skills and knowledge required for a detail draftsperson producing specialist engineering drawings within an engineering or manufacturing work environment.

Application

The qualification has been developed with manufacturing and engineering-related industry sectors as a focus and may be packaged to meet the specific needs of drafting in mechanical and machine construction and maintenance, steel fabrication, other fabrication services and assembly, mechanical services, electrical services, fluid power, piping assembly, and so on. Application of this qualification involves producing detail drawings according to engineering design intent and required Australian Standards (AS). Skills required include use of computer-aided design (CAD) software functions and ability to apply industry and discipline specific knowledge to produce models, drawings and schematics for specialised engineering-related areas of industry. Skills required include knowledge of engineering principles for the specialised area as well as mathematics together with appropriate drafting skills. The qualification applies to drawings produced to specifications required by designers and to all relevant standards, including AS 1100.101–1992 Technical drawing – General principles. Skills covered may also include information gathering, such as on-site visits, calculations, consultations and research.

Pathways Information

Pathways into the qualification

This qualification may be accessed by direct entry. Credit for relevant units of competency achieved will be granted towards this qualification for those who have completed MEM30505 Certificate III in Engineering - Technical, or MSA30208 Certificate III in Manufacturing Technology, or other relevant qualifications.

Pathways from the qualification

Further training pathways from this qualification include the MSA50108 Diploma of Manufacturing Technology (Structural Steel Detailing stream) or the MEM50211 Diploma of Engineering - Technical.

Licensing/Regulatory Information

There are no specific licences that relate to this qualification.

Entry Requirements

There are no entry requirements for this qualification.

Employability Skills Summary

Employability Skill	Industry/enterprise requirements for this qualification include:
Communication	• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents • Produce sketches, diagrams, charts or graphs • Check and clarify work-related information • Provide clear and precise information to others, including team members, apprentices and production employees • Produce engineering drawings complete with all references and notations to communicate design detail • Recognise and use common engineering terminology and symbols • Liaise with appropriate authorities
Teamwork	• Work alone or as part of a team • Contribute to a group effort in order to plan and carry out work • Identify work roles, communicate and cooperate with others
Problem solving	• Undertake numerical operations, geometry and calculations/formulae, including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages • Use engineering measuring techniques • Inspect quality of own or other employee's work • Assess operation and condition of equipment against specifications • Analyse information from drawings, design documents, manuals and reports • Develop, implement and evaluate solutions to problems • Translate designs into drawing documents
Initiative and enterprise	• Be capable of applying the competency in new and different situations and contexts • Identify actual and foreseeable workplace hazards during course of work • Implement OHS risk management procedures • Modify work plan to overcome unforeseen difficulties or

	developments that occur as work progresses • Participate in improvement procedures, including process, quality and internal/external customer/supplier relationships • Economise material and energy use and minimise waste
Planning and organising	• Plan, prioritise and sequence work operations to ensure completion of activities within schedules • Organise and analyse information relevant to work • Set up jobs prior to commencement of work, including selection of appropriate tools and equipment
Self-management	• Carry out work safely and in accordance with company policy and procedures, environmental and other legislative requirements • Monitor performance of own and other's work to ensure customer satisfaction, efficiency and sustainability • Take responsibility for own work outcomes • Apply techniques, procedures, tools and equipment for compliance with project specifications • Ensure work complies with industry standards
Learning	• Check and clarify task-related information with appropriate personnel, engineer or designer • Identify internal or external customer requirements with respect to the work to be performed • Assess and modify own work practices • Use equipment manuals, online help and other reference materials, such as catalogues/lists, as required • Maintain current knowledge of applicable standards, legislation, environmental and other codes of practice and product/process developments • Assist with on-the-job training and assessment
Technology	• Select, set up and use appropriate tools and equipment • Select and use appropriate measuring devices to ensure compliance with tolerances and other specifications • Navigate technology to access/input/store/retrieve/save and produce information/data using appropriate software applications • Apply knowledge of appropriate engineering principles, techniques, procedures, diagnostic methods, tools and equipment to achieve the required outcome

	• Check equipment and instruments for accuracy • Improve efficiency of equipment in order to minimise waste

Packaging Rules

To be awarded the MEM40412 Certificate IV in Engineering Drafting, competency must be achieved in **fifteen (15)** units of competency:

- **four (4)** core units of competency
- **eleven (11)** elective units of competency, chosen as described below.

Prerequisites

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

Core units of competency

The following **four (4)** units must be chosen.

Unit code	Unit title
MEM16006A	Organise and communicate information
MEM16008A	Interact with computing technology
MEM30012A	Apply mathematical techniques in a manufacturing, engineering or related environment
MSAENV272B	Participate in environmentally sustainable work practices

Elective units of competency

Select **eleven (11)** elective units:

- a minimum of **eight (8)** from Group A below
- the balance may be chosen from Group A or Group B General Electives.

A maximum of **two (2)** general electives may be imported from other qualifications in this Training Package, other endorsed Training Packages and accredited courses where those units are available at Certificate III or IV level.

Group A – Specialisation units

Unit code	Unit title	Prerequisites
MEM09002B	Interpret technical drawing	
MEM09201A	Work effectively in an engineering drafting workplace	
MEM09202A	Produce freehand sketches	
MEM09203A	Measure and sketch site information	
MEM09204A	Produce basic engineering detail drawings	*
MEM09205A	Produce electrical schematic drawings	*
MEM09206A	Produce drawings for mechanical services	*
MEM09207A	Produce drawings for reticulated services	*
MEM09208A	Detail fasteners and locking devices in mechanical drawings	*
MEM09209A	Detail bearings, seals and other componentry in mechanical drawings	*
MEM09210A	Create 3-D solid models using computer-aided design (CAD) system	*
MEM09211A	Produce drawings or models for industrial piping	*
MEM09212A	Produce detailed drawings of steel to non-steel connections	*
MEM09213A	Produce schematic drawings for hydraulic and pneumatic fluid power systems	*
MEM09216A	Interpret and produce curved 3-D shapes and patterns	
MEM09217A	Prepare plans for pipe and duct fabrication	*
MEM09218A	Participate in drafting projects for building services	*
MEM09219A	Prepare drawings for fabricated sheet metal	*

	products	
MEM09220A	Apply surface modelling techniques to 3-D drawings	*
MEM09221A	Create 3-D model assemblies using computer-aided design (CAD) system	*
MEM12023A	Perform engineering measurements	
MEM15001B	Perform basic statistical quality control	
MEM16014A	Report technical information	*
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements	
MEM30032A	Produce basic engineering drawings	
MEM30033A	Use computer-aided design (CAD) to create and display 3-D models	*
CPCCOHS1001A	Work safely in the construction industry	
CPCPCM4002A	Estimate and cost work	
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	*
MSATCS302A	Detail bolts and welds for structural steelwork connections	*
MSATCS501A	Detail standardised structural connections	*
MSATCS502A	Detail structural steel members	*
MSATCS504A	Detail ancillary steelwork	*
UEPMNT419B	Perform civil drafting	
Group B – General electives		

Unit code	Unit title	Prerequisites
MEM05051A	Select welding processes	
MEM12024A	Perform computations	
MEM16003B	Provide advanced customer service	
MEM30005A	Calculate force systems within simple beam structures	*
MEM30006A	Calculate stresses in simple structures	*
MEM30007A	Select common engineering materials	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications	
MEM30010A	Set up basic hydraulic circuits	
MEM30011A	Set up basic pneumatic circuits	
MEM30013A	Assist in the preparation of a basic workplace layout	
MEM30016A	Assist in the analysis of a supply chain	
MEM30019A	Use resource planning software systems in manufacturing	*
MEM30023A	Prepare a simple cost estimate for a manufactured product	
MEM30024A	Participate in quality assurance techniques	*
MEM30025A	Analyse a simple electrical system circuit	*
FDFOP2005A	Work in a socially diverse environment	
LMTGN4002A	Participate in product engineering	
MSS402002A	Sustain process improvements	
MSS402030A	Apply cost factors to work practices	

MSS402051A	Apply quality standards	

Custom Content Section

Not applicable.