



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM40105 Certificate IV in Engineering**

**Release: 1**

## **MEM40105 Certificate IV in Engineering**

### **Modification History**

Not Applicable

## 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, 1<sup>st</sup> 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

<b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b>	
<b>Employability Skill</b>	<b>Industry/enterprise requirements for this qualification include:</b>
Communication	<ul style="list-style-type: none"> <li>• Read, interpret, follow and communicate information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents</li> <li>• Produce sketches, diagrams, charts or graphs</li> <li>• Check and clarify trade related information</li> <li>• Provide clear and precise information to others including trade team members, apprentices, production employees</li> <li>• Recognise and use common engineering terminology and symbols</li> <li>• Liaise with appropriate authorities</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>• Work alone or as part of a trade team</li> <li>• Contribute to a group effort in order to plan and carry out work</li> <li>• Identify work roles, communicate and cooperate with others</li> </ul>
Problem-solving	<ul style="list-style-type: none"> <li>• Undertake numerical operations, geometry and calculations/ formulae (including addition, subtraction, multiplication, division, fractions and decimals, percentages and proportions, simple ratios and averages)</li> <li>• Use advanced measuring techniques</li> <li>• Inspect quality of own or other employee's work</li> <li>• Assess operation and condition of equipment against specifications or manufacturer's requirements</li> <li>• Analyse information from drawings, production data, manuals and reports from other employees to improve equipment performance</li> <li>• Use diagnostic skills and tests to identify and determine causes of faults, including interpretation of in-built fault indicators and error codes</li> <li>• Develop, implement and evaluate solutions to problems</li> <li>• Translate designs into practical outcomes</li> </ul>
Initiative and enterprise	<ul style="list-style-type: none"> <li>• Be capable of applying the competency in new and different situations and contexts</li> <li>• Identify actual and foreseeable workplace hazards during course of work</li> <li>• Implement OHS risk management procedures</li> <li>• Modify work plan to overcome unforeseen difficulties or developments that occur as work progresses</li> <li>• Participate in improvement procedures including process,</li> </ul>

<b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b>	
	<p>quality and internal/external customer/supplier relationships</p> <ul style="list-style-type: none"> <li>• Economise material and energy use and minimise waste</li> </ul>
Planning and organising	<ul style="list-style-type: none"> <li>• Plan, prioritise and sequence maintenance and repair operations to ensure completion of activities within schedules and with minimal disruption to scheduled production</li> <li>• Plan allocation of work to others including apprentices, trades assistants to ensure efficiency and safety</li> <li>• Organise and analyse information relevant to work</li> <li>• Set up jobs prior to commencement of work including selection of appropriate tools, equipment and materials and adjustment of equipment</li> </ul>
Self-management	<ul style="list-style-type: none"> <li>• Carry out work safely and in accordance with company policy and procedures, manufacturer's recommendations, environmental and other legislative requirements</li> <li>• Monitor performance of own and other's work to ensure customer satisfaction, efficiency and sustainability</li> <li>• Take responsibility for own work outcomes</li> <li>• Apply techniques, procedures, tools and equipment for compliance with site or manufacturers' specifications.</li> </ul>
Learning	<ul style="list-style-type: none"> <li>• Check and clarify task related information with appropriate personnel or technical adviser</li> <li>• Identify internal or external customer requirements with respect to the work to be performed</li> <li>• Assess and modify own work practices</li> <li>• Use workshop and equipment manuals, online help, and other reference materials such as catalogues/lists as required</li> <li>• Maintain current knowledge of applicable standards, legislation, environmental and other codes of practice and product/process developments</li> <li>• Assist with on the job training and assessment</li> </ul>
Technology	<ul style="list-style-type: none"> <li>• Select, set up and use appropriate tools, equipment, materials and machines</li> <li>• Select and use appropriate measuring and testing devices to ensure compliance with tolerances and other specifications</li> <li>• Navigate technology to access /input /store/retrieve/save and produce information/data using appropriate software applications</li> <li>• Apply knowledge of appropriate engineering principles, techniques, procedures, diagnostic methods, tools and equipment to achieve the required outcome</li> <li>• Check equipment and instruments for accuracy</li> <li>• Improve efficiency of machines and equipment in order to</li> </ul>

<b>EMPLOYABILITY SKILLS QUALIFICATION SUMMARY</b>	
	minimise waste

## Packaging Rules

### 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
MEM12023A	Perform engineering measurements
MEM12024A	Perform computations
MEM13014A	Apply principles of occupational health and safety in the work environment



<b>Unit code</b>	<b>Unit title</b>
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
MEM04020A	Supervise individual ferrous melting and casting operation	4
MEM04021A	Supervise individual non ferrous melting and casting operation	4
MEM04022A	Examine appropriateness of methoding for mould design	4
MEM04023A	Undertake prescribed tests on foundry related materials	4
MEM05024B	Perform welding supervision	12
MEM05025C	Perform welding/fabrication inspection	12

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	robots	
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
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	8

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	scheduling	
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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 multiple loop control systems	8
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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	6

Unit code	Unit title	P
	components	
MEM21023A	Plan, set up and operate horological workshop or service centre	4
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
AURV225908A	Carry out panel repairs	4
BSBOHS502A	Participate in the management of the OHS information and data	2



<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	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 machine	4
MEM04004B	Prepare and mix sand for metal moulding	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
MEM04019B	Perform refractory installation and repair	4
MEM05001B	Perform manual soldering/desoldering - electrical/electronic components	4
MEM05002B	Perform high reliability soldering	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	and desoldering	
MEM05003B	Perform soft soldering	2
MEM05004C	Perform routine oxy acetylene welding	2
MEM05005B	Carry out mechanical cutting	2
MEM05006B	Perform brazing and/or silver soldering	2
MEM05007C	Perform manual heating and thermal cutting	2
MEM05008C	Perform advanced manual thermal cutting, gouging and shaping	2
MEM05009C	Perform automated thermal cutting	2
MEM05010C	Apply fabrication, forming and shaping techniques	8
MEM05011D	Assemble fabricated components	8
MEM05012C	Perform routine manual metal arc welding	2
MEM05013C	Perform manual production welding	2
MEM05014C	Monitor quality of production welding/fabrications	2
MEM05015D	Weld using manual metal arc welding process	4
MEM05016C	Perform advanced welding using manual metal arc welding process	4
MEM05017D	Weld using gas metal arc welding process	4
MEM05018C	Perform advanced welding using gas metal arc welding process	4
MEM05019D	Weld using gas tungsten arc	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	welding process	
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
MEM06003C	Carry out heat treatment	6
MEM06004B	Select heat treatment processes and test finished product	6
MEM06005B	Perform drop and upset forging	4
MEM06006C	Repair springs	4
MEM06007B	Perform basic incidental heat/quenching, tempering and annealing	2
MEM06008A	Hammer forge complex shapes	4
MEM06009A	Hand forge complex shapes	4
MEM07001B	Perform operational maintenance of machines/equipment	2
MEM07002B	Perform precision shaping/planing/slotting operations	4
MEM07003B	Perform machine setting (routine)	4
MEM07004B	Perform machine setting (complex)	8
MEM07005C	Perform general machining	8
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	load/unload work	
MEM08002C	Pre-treat work for subsequent surface coating	4
MEM08003C	Perform electroplating operations	6
MEM08004B	Finish work using wet, dry and vapour deposition methods	4
MEM08005B	Prepare and produce specialised coatings	4
MEM08006B	Produce clear and/or coloured and/or sealed anodised films on aluminium	2
MEM08007B	Control surface finish production and finished product quality	4
MEM08008B	Operate and control surface finishing waste treatment process	3
MEM08009C	Make up solutions	2
MEM08010B	Manually finish/polish materials	6
MEM08011B	Prepare surfaces using solvents and/or mechanical means	2
MEM08012B	Prepare surfaces by abrasive blasting (basic)	4
MEM08013B	Prepare surfaces by abrasive blasting (advanced)	4
MEM08014B	Apply protective coatings (basic)	4
MEM08015B	Apply protective coatings (advanced)	4
MEM08016B	Control blast coating by-products, materials and emissions	1
MEM08018B	Electroplate engineering coatings	6
MEM08019B	Electroplate protective finishes	6

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



<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	systems and associated pipework	
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
MEM11007B	Administer inventory procedures	4
MEM11008B	Package materials (stores and warehouse)	2
MEM11009B	Handle/move bulk fluids/gases	4
MEM11010B	Operate mobile load shifting equipment	4
MEM11011B	Undertake manual handling	2
MEM11012B	Purchase materials	6
MEM11013B	Undertake warehouse receipt process	4
MEM11014B	Undertake warehouse dispatch process	4
MEM11015B	Manage warehouse inventory system	6
MEM11016B	Order materials	2
MEM11017B	Organise and lead stocktakes	4
MEM11018B	Organise and maintain warehouse stock receipt and/or dispatch system	6

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	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
MEM18005B	Perform fault diagnosis, installation and removal of bearings	4
MEM18006C	Repair and fit engineering	6

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	components	
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 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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
MEM18048B	Fault find and repair/rectify basic electrical circuits	12
MEM18052B	Maintain fluid power systems for	4

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
	mobile plant	
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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 system	4
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



<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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

<b>Unit code</b>	<b>Unit title</b>	<b>P</b>
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
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

Unit code	Unit title	P
PMBPROD394B	Produce composites using resin transfer moulding	4
PMBPROD398B	Produce composites using pre-pregs	4
PRSTS202A	Install security equipment/system	4
PRSTS302A	Program security equipment/system	2
PRSTS303A	Test installed security equipment/system	2
PRSTS304A	Commission/decommission security equipment/system	2
PRSTS305A	Identify and diagnose electronic security equipment/ system fault	2
PRSTS307A	Maintain and service security equipment/system	4
PRSTS317A	Provide estimate and quote	4
PRSTS319A	Modify and repair security equipment/system	4

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
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