



Australian Government

MEM04017 Develop and manufacture gear, conveyor screw and propeller patterns

Release: 2

MEM04017 Develop and manufacture gear, conveyor screw and propeller patterns

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM04017 Develop and manufacture gear, conveyor screw and propeller patterns (Release 1).

Release 1. Supersedes and is equivalent to MEM04017B Develop and manufacture gear, conveyor screw and propeller patterns.

Application

This unit of competency defines the skills and knowledge required to manufacture patterns for all types of cast gears, conveyor screws and marine propellers using a full range of materials.

Gear patterns may be segmented or any other method used to minimise timber shrinkage or warpage to achieve the required strength.

Conveyor and marine screws may be built up using predetermined thickened timber, either over a mandrel or a layout. Patterns may be set up on a joint board or plated for ease of moulding.

Where the assembly of plated patterns is required unit MEM04012 Assemble plated patterns should also be selected.

Where the selection and use of precision measurement is required unit MEM12003 Perform precision mechanical measurement should also be selected.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: A

Unit Weight: 4

Pre-requisite Unit

MEM04010	Develop and manufacture wood patterns
MEM04018	Perform general woodworking machine operations
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12006	Mark off/out (general engineering)
MEM12023	Perform engineering measurements

MEM12024	Perform computations
MEM12026	Perform advanced trade calculations in a manufacturing, engineering or related environment
MEM13015	Work safely and effectively in manufacturing and engineering
MEM14006	Plan work activities
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations

Competency Field

Casting and moulding

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1	Determine job requirements	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, drawings, job sheets or work instructions
2	Lay out pattern	2.1	Select appropriate material to specifications
		2.2	Apply moulding, cast techniques and foundry processes in determining the type of pattern required
		2.3	Calculate pattern parameters
		2.4	Lay out pattern showing tapers, machining allowances, core prints and method of construction to specification

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

		2.5	Develop and manufacture jigs and fixtures to aid the manufacture of the pattern form as required
3	Manufacture pattern	3.1	Mark out material and develop construction to meet specifications
		3.2	Produce pattern or pattern component parts to size and shape using appropriate hand and hand held power tools, techniques and procedures
		3.3	Check pattern or pattern component parts for compliance to specifications
		3.4	Join and fix pattern component parts according to specifications
		3.5	Mark, colour-code and/or tag pattern in compliance with specifications or procedures

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Material includes one (1) or more of the following:

- hardwood
- softwood
- epoxy resins
- composites

Pattern parameters include one (1) or more

- pitch circles
- pressure angles

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of the following:

- tooth form
- left and right hand flight helix
- pitch axial dimensions
- angles
- tapers
- clearances
- contraction allowances

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM04017 Develop and manufacture gear, conveyor screw and propeller patterns (Release 1).

Release 1. Supersedes and is equivalent to MEM04017B Develop and manufacture gear, conveyor screw and propeller patterns.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM04017 Develop and manufacture gear, conveyor screw and propeller patterns

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- planning the appropriate pattern by identifying and interpreting specifications, sketches, drawings and other applicable reference documents in determining type of pattern required
- selecting appropriate materials, applying moulding, casting techniques and foundry processes to the type of pattern required
- undertaking calculations of pattern parameters appropriate to developing various types of gear, conveyor and propeller forms
- laying out pattern according to specification showing tapers, machining allowances, core prints and method construction
- designing and manufacturing jigs and fixtures as required
- manufacturing pattern by marking out material for construction, producing pattern or pattern components to size and shape utilising appropriate hand and power tools
- joining and fixing pattern component parts as required and checking final product for compliance with specifications
- marking, colour coding and/or tagging pattern according to SOPs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- timber, epoxy resin and composite product knowledge, including features, characteristics and applications
- moulding and casting techniques for cast gears, conveyor screws and marine propellers
- tooling required for casting/moulding
- methoding techniques

- use and application of jigs and fixtures
- methods of construction
- techniques, tools and equipment to measure, mark out and produce gear, conveyor screw and propeller patterns
- mathematical calculations and formulae required to manufacture patterns/core boxes - contraction, taper, pitch, profiles, clearances and machining allowances
- identification coding and numbering
- pattern checking techniques
- mouldability, i.e. surface finish, face taper, convex or concave perspectives and undercuts.

Assessment Conditions

- Assessors must:
 - have vocational competency in the development and manufacture of gear, conveyor screw and propeller patterns at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Assessment must occur in a functioning workplace. Where assessment in the workplace would be unsafe, impractical or threatens the environment, assessment must occur in a sufficiently rigorous simulated environment that reflects the circumstances that would be experienced in a functioning workplace. Assessment must cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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