



Australian Government

MEM04014 Develop and manufacture production patterns

Release: 2

MEM04014 Develop and manufacture production patterns

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM04014 Develop and manufacture production patterns (Release 1).

Release 1. Supersedes and is equivalent to MEM04014B Develop and manufacture production patterns.

Application

This unit of competency defines the skills and knowledge required to manufacture all types of metal patterns, master patterns, core boxes and associated equipment, including cast plates made directly or from a master pattern.

Patterns may be integral with the plate or mounted to the plates with gating and depending upon specifications, production core boxes also may be loose or mounted into core box rigs.

Where the manufacture of polymer production patterns is required unit MEM04011 Produce polymer 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: 8

Pre-requisite Unit

MEM04010	Develop and manufacture wood patterns
MEM04012	Assemble plated patterns
MEM04018	Perform general woodworking machine operations
MEM07005	Perform general machining
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	Prepare to undertake work	2.1	Develop and plan pattern and design with reference to customer's specification (written or verbal) for number, layout, runner system and core box design
		2.2	Interpret and visualise pattern design from drawings, prints or plans and check against customer requirements
		2.3	Develop a plan for sequence of manufacture for either a high or low volume foundry production pattern

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
3	Develop pattern equipment	3.1	Select and obtain appropriate materials to meet requirements of strength, durability and component finish
		3.2	Perform calculations appropriate to establishing pattern parameters
4	Manufacture production patterns and core boxes	4.1	Select appropriate machines and machining process to shape and produce production patterns and core boxes to specification
		4.2	Select and use a range of hand and hand held power tools to fashion and manufacture production patterns and core boxes to specification
		4.3	Check production patterns and core boxes to specification and surface finish and check for mouldability

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.

Materials include one (1) or more of the following:

- ferrous
- non-ferrous
- alloy

Calculations include one (1) or more of the following:

- angles
- tapers
- contraction rates

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.

Machines include one (1) or more of the following:

- lathes
- milling machines
- grinders
- pedestal drills
- pantographs
- other appropriate machines

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM04014 Develop and manufacture production patterns (Release 1).

Release 1. Supersedes and is equivalent to MEM04014B Develop and manufacture production patterns.

Links

The MEM Metal and Engineering Training Package Companion Volume Implementation Guide is available from VETNet -

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

Assessment Requirements for MEM04014 Develop and manufacture production 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 pattern and designing by reading and interpreting customer's specifications (verbal or written) for number, layout, runner system and core box design
- interpreting and visualising pattern design and checking against customer requirements
- developing a plan for sequence of manufacture for a low or high volume
- developing pattern equipment by selecting and obtaining appropriate materials
- undertaking mathematical calculations for angles, tapers, clearances and determination of contraction rates
- selecting and using appropriate machines, machining process and hand and power tools as needed to shape, produce, fashion and manufacture production patterns and core boxes to specification
- checking production patterns and core boxes for surface finish, mouldability to specification.

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)
- characteristics of metals and alloys and their application in the development and manufacture of production patterns
- tolerances and contraction rates typically used in the manufacture of production patterns
- production moulding and casting techniques
- tooling required for casting and moulding
- methoding techniques
- use and application of jigs and fixtures
- methods of construction, including machining provision and clamping arrangements

- appropriate techniques, tools and equipment to measure, mark out and produce production patterns
- formulae and mathematical techniques required for manufacturing production patterns and core boxes, i.e. contraction, taper, 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 production 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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