



Australian Government

MEM04016 Develop and manufacture precision models

Release: 2

MEM04016 Develop and manufacture precision models

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM04016 Develop and manufacture precision models (Release 1).

Release 1. Supersedes and is equivalent to MEM04016C Develop and manufacture precision models.

Application

This unit of competency defines the skills and knowledge required to develop and manufacture precision models where accurate and complicated models are required to assist in the development and manufacture of production of tooling for a wide variety of processes.

This unit can also apply to the inspection/completion of items made in the stereo lithography process.

When the programming of coordinate measurement machines and/or NC/CNC machines is required appropriate machine programming units should also be selected.

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

Band: A

Unit Weight: 6

Pre-requisite Unit

MEM04010	Develop and manufacture wood patterns
MEM04011	Produce polymer patterns
MEM04012	Assemble plated patterns
MEM04013	Develop and manufacture polystyrene patterns
MEM04014	Develop and manufacture production patterns
MEM04015	Develop and manufacture vacuum forming moulds and associated equipment
MEM04018	Perform general woodworking machine operations
MEM07005	Perform general machining
MEM09002	Interpret technical drawing

MEM11011	Undertake manual handling
MEM12003	Perform precision mechanical measurement
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
MEM13003	Work safely with industrial chemicals and materials
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

Elements describe the essential outcomes.

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

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|---|--------------------------|-----|--|
| 2 | Lay out model | 2.1 | Select appropriate material to meet specifications |
| | | 2.2 | Develop and plan finished model design with reference to customer's specifications (written or verbal) for finish, quality and form, using applicable processes |
| | | 2.3 | Calculate contractions allowances, clearances and tapers to establish model parameters |
| | | 2.4 | Design and manufacture datum boards, jigs and fixtures as required |
| | | | |
| 3 | Manufacture model | 3.1 | Determine sequence of manufacture, including build-up on datum board, and establishing datum's mark out of model and areas to be NC/CNC machined |
| | | 3.2 | Select and use appropriate machines and machining processes to shape/produce model to specifications |
| | | 3.3 | Select and use a range of hand and hand held power tools to fashion and manufacture model to fine tolerances according to specifications, ensuring that surface finish is appropriate to the type of model |
| | | 3.4 | Undertake appropriate measurement/calculations to check specifications, including coordinate measuring and machine checking as required |
| | | 3.5 | Record and report all deviations or modifications to original tooling design, prints or plans, consistent with 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.

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

- flow
- viewing
- prototype
- development

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

- timber
- metal
- plastic
- fibreglass
- composites

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

- high volume foundry tooling
- blow moulding
- metal forming
- vacuum forming
- rotational moulding
- gravity die casting
- pressure die casting
- low pressure die casting
- complex ferrous and non-ferrous castings
- plastic injection moulding

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

- complex drawings
- Mylar drawings
- technical sketches
- customer requirements

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM04016 Develop and manufacture precision models (Release 1).

Release 1. Supersedes and is equivalent to MEM04016C Develop and manufacture precision models.

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 MEM04016 Develop and manufacture precision models

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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 finished model design by reading, interpreting customer's specifications (verbal or written) for finish, quality and form, and selecting appropriate material
- undertaking calculations for contraction allowances, clearances and tapers to establish model parameters
- designing and manufacturing datum boards, jigs and fixtures as required
- determining sequence of manufacture, including build-up on datum board, marking out and areas to be NC/CNC machined
- selecting and using appropriate machines and machining process
- selecting and using hand and power tools as needed to shape, produce, fashion and manufacture model to fine tolerances according to specification ensuring that surface finish is appropriate to the type of model
- checking specifications by using appropriate measuring techniques, including coordinate measuring and machine checking
- recording all deviations or modifications to original tool design, prints or plans 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)
- consequences of selecting inappropriate materials
- various processes requiring models
- calculus, engineering calculations and formulae relating to developing and manufacturing precision models
- properties and uses of datum boards, datum holes or datum faces

- reasons for developing the sequence of manufacture
- range of machines and machining processes and their operations
- various checking procedures and devices, such as coordinate measuring and machine checking
- procedures for recording deviation or modification to original drawings or specifications.

Assessment Conditions

- Assessors must:
 - have vocational competency in the development and manufacture of precision models 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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