



Australian Government

MEM04043 Develop and manufacture precision models

Release: 1

MEM04043 Develop and manufacture precision models

Modification History

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

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 and/or completion of items made in the stereo-lithography process.

Where the programming of coordinate measurement machines and/or numerical control (NC) or computer numerical control (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

MEM04038 Produce polymer patterns

MEM04039 Assemble plated patterns

MEM04040 Develop and manufacture polystyrene patterns

MEM04041 Develop and manufacture production patterns

MEM04042 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	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
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
2. Develop and lay out model	2.1 Select appropriate material to meet specifications 2.2 Develop and plan finished model design with reference to customer specifications for finish, quality and form, using applicable processes 2.3 Calculate contraction allowances, clearances and tapers to establish model parameters 2.4 Design and manufacture datum boards, jigs and fixtures to meet work requirements
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 or CNC machined 3.2 Select and use appropriate machines and machining processes to shape or produce model to specifications 3.3 Select and use 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 measurements and calculations to check specifications, including coordinate measuring and machine checking as required

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	3.5 Record and report all deviations or modifications to original tooling design or specifications in accordance with SOPs

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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.

<i>Specifications include one or more of the following:</i>	• drawings • job sheets • work instructions.
Models include one or more of the following:	• flow • viewing • prototype • development.
Material includes one or more of the following:	• timber • metal • plastic • fibreglass • composites.
Processes include one 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 nonferrous castings • plastic injection moulding.
Specifications include one or more of the following:	• complex drawings • Mylar drawings • technical sketches • customer requirements.

Unit Mapping Information

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

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 MEM04043 Develop and manufacture precision models

Modification History

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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 and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- planning finished model design by interpreting customer specifications (verbal or written) for finish, quality and form, and selecting appropriate materials
- 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 on at least two occasions, including build-up on datum board, marking out and areas to be numerical control (NC) or computer numerical control (CNC) machined
- selecting and using appropriate machines and machining process on at least two occasions
- selecting and using hand and power tools to shape, produce, fashion and manufacture model to fine tolerances to specifications on at least two occasions, ensuring that surface finish is appropriate to the type of model
- checking specifications on at least two occasions by using appropriate measuring techniques, including coordinate measuring and machine checking
- recording all deviations or modifications to original tooling design or specifications in accordance with SOPs.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

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
- types of processes requiring models
- calculus, engineering calculations and formulae for developing and manufacturing precision models
- properties and uses of datum boards, datum holes or datum faces
- reasons for developing the sequence of manufacture

- different types of machines and machining processes and their operations
- checking procedures and devices, such as coordinate measuring and machine checking
- procedures for recording deviations or modifications to original design or specifications.
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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.
- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, 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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