



**Australian Government**

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

# **MEM04016C Develop and manufacture precision models**

**Release: 1**

## **MEM04016C Develop and manufacture precision models**

### **Modification History**

Not Applicable

## Unit Descriptor

<b>Unit descriptor</b>	This unit covers laying out, manufacturing and finishing precision models.
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## Application of the Unit

<b>Application of the unit</b>	<p>This unit applies where accurate and complicated models are required to assist in the development and manufacture of production of tooling for a wide variety of processes, such as 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, etc.</p> <p>Models may include flow models, viewing models, prototype and development models using a wide range of materials e.g. timber, metal plastic, fibreglass composites and processes. It may include the inspection/completion of items made in the stereo lithography process etc.</p> <p>Work is undertaken autonomously or in a team environment using predetermined standards of quality, safety and workshop procedures. All specifications are interpreted from complex drawings and Mylar drawings, technical sketches and/or customer requirements.</p> <p>When the programming of coordinate measurement machines and/or NC/CNC machines is required see appropriate machine programming units.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 6</b></p>
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## Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

Prerequisite units		
<b>Path 1</b>	MEM04010B	Develop and manufacture wood patterns
	MEM04011B	Produce polymer patterns
	MEM04012B	Assemble plated patterns
	MEM04013B	Develop and manufacture polystyrene patterns
	MEM04014B	Develop and manufacture production patterns
	MEM04015B	Develop and manufacture vacuum forming moulds and associated equipment
	MEM04018B	Perform general woodworking machine operations
	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12006C	Mark off/out (general engineering)
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM13003B	Work safely with industrial chemicals and materials
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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## Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Drawings, instructions and specifications are interpreted and understood. 1.2. Appropriate material is selected to meet specifications.
2. Layout model	2.1. Finished model design is conceptualised and planned with reference to customer's specifications (written or verbal) for finish, quality and form, using applicable processes. 2.2. Contractions allowances, clearances, tapers etc. are calculated to establish model parameters. 2.3. Datum boards, jigs and fixtures are designed and manufactured as required.
3. Manufacture model	3.1. Sequence of manufacture, including build-up on datum board, establishing datum's mark out of model and areas to be NC/CNC machined, are determined. 3.2. Appropriate machines and machining processes are selected to shape/produce model to specifications. 3.3. A range of hand and hand held power tools is selected and used utilising acceptable techniques and procedures to fashion/manufacture model to fine tolerances according to specifications, ensuring that surface finish is appropriate to the type of model. 3.4. Appropriate measurement/calculations are undertaken to check specifications, including coordinate measuring and machine checking as required. 3.5. Where necessary, all deviations or modifications to original tooling design, prints or plans, are recorded and reported consistent with standard operating procedures.

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

#### Required skills

**REQUIRED SKILLS AND KNOWLEDGE**

Look for evidence that confirms skills in:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- selecting appropriate materials
- conceptualising and determining type of model required to meet specifications
- performing calculations necessary for manufacture
- developing and manufacturing datum boards, datum holes or datum faces, jigs and fixtures etc. required for accurate manufacture
- developing a planned sequence of manufacture
- identifying areas required to be accurately manufactured by NC/CNC
- selecting and operating the appropriate range of machines and machining processes for manufacturing the model accurately to size, tolerance and specifications
- using required hand and hand held power tools
- measuring components to specified tolerances
- carrying out checking procedures for checking to the predetermined accuracy and fine tolerances
- orally reporting routine information
- recording

**Required knowledge**

Look for evidence that confirms knowledge of:

- 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
- the range of machines and machining processes and their operations
- the various checking procedures and devices including coordinate measuring and machine checking
- procedures for recording deviation or modification to original drawings or specifications
- hazards and control measures associated with developing and manufacturing precision models
- safe work practices and procedures

## Evidence Guide

### EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

#### Overview of assessment

A person who demonstrates competency in this unit must be able to develop and manufacture precision models. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

#### Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.

#### Context of and specific resources for assessment

This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with developing and manufacturing precision models or other units requiring the exercise of the skills and knowledge covered by this unit.

#### Method of assessment

Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.



**EVIDENCE GUIDE**

<b>Guidance information for assessment</b>	
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**Range Statement****RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<b>Material</b>	Timber, metal, plastic, fibreglass, composites etc.
<b>Processes</b>	High volume foundry tooling, injection moulding, pressure die casting etc.

**Unit Sector(s)**

<b>Unit sector</b>	
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**Co-requisite units**

<b>Co-requisite units</b>	

## Competency field

Competency field	Casting and moulding
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