Australian Government

Department of Education, Employment and Workplace Relations

MEM04014B Develop and manufacture production patterns

Release: 1

MEM04014B Develop and manufacture production patterns

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	

Application of the Unit

Application of the unit	This unit applies to the manufacture of all types of metal patterns, master patterns, core boxes and associated equipment including cast plates etc., applying pattern making principles. Patterns may be made directly or from a master pattern. Patterns may be integral with the plate or mounted to the plates with gating. Depending upon specifications, production core boxes also may be loose or mounted into core box rigs etc. Patterns and core boxes are manufactured from a range of ferrous, non-ferrous and alloy materials, using a range of metal cutting and shaping tools and machines. Where the manufacture of polymer production patterns is required, Unit MEM04011B (Produce polymer patterns) should be considered. Where precision measurement is required, Unit MEM12003B (Perform precision mechanical measurement) should also be considered. **Band**: **A** **Unit Weight**: **8**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM04010B	Develop and manufacture wood patterns
	MEM04012B	Assemble plated patterns
	MEM04018B	Perform general woodworking machine operations
	MEM07005C	Perform general machining
	MEM09002B	Interpret technical drawing
	MEM12006C	Mark off/out (general engineering)
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	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

Employability skills	This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine job requirements	1.1. Drawings, instructions and specifications are interpreted and understood. 1.2. Pattern type and design is conceptualised and planned with reference to customer's specification (written or verbal) for number, layout, runner system and core box design. 1.3. Pattern design is interpreted and visualised from drawings, prints or plans and checked against customer requirements. 1.4. A plan is developed for sequence of manufacture for either a high or low volume foundry production pattern.
2. Develop pattern equipment	2.1. Appropriate materials are selected and obtained to meet requirements of strength, durability and component finish etc. 2.2. Calculations appropriate to establishing pattern parameters are performed, including angles, tapers, contraction, etc. where applicable.
3. Manufacture production patterns and core boxes	3.1. Appropriate machines and machining process are selected to shape/produce production patterns and core boxes to specification. 3.2. A range of hand and hand held power tools are selected to fashion/manufacture production patterns and core boxes to specification. 3.3. Production patterns and core boxes are checked to specification and surface finish and are checked for mouldability.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in: • determining job requirements from written instructions, sketches and drawings • planning and sequencing manufacturing operations

REQUIRED SKILLS AND KNOWLEDGE
• checking and clarifying task-related information • selecting appropriate metals to suit the moulding/casting techniques and foundry process • laying out/constructing production pattern/core boxes • joining and fixing component parts • checking pattern for conformance to specifications • measuring components to specified tolerances • calculating contraction rates
Required knowledge
Look for evidence that confirms knowledge of: • characteristics of metals and alloys and their application in the development/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/moulding • methoding techniques • the 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 • the formulae and mathematical techniques required for manufacturing production patterns/core boxes i.e. contraction, taper, clearances, machining allowances etc. • identification coding and numbering • pattern checking techniques • mouldability i.e. surface finish, face taper, convex or concave perspectives, undercuts, etc. • use and application of personal protective equipment • safe work practices and procedures • hazards and control measures associated with developing and manufacturing production patterns

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 production patterns. 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 production patterns 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	
Guidance information for assessment	

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.	
Appropriate materials	A range of ferrous, non-ferrous and alloy materials
Calculations	The determination of contraction rates as well as general engineering calculations
Appropriate machines	Lathes, milling machines, grinders, pedestal drills, pantographs and other machines as needed

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Casting and moulding