



Australian Government

Department of Education, Employment and Workplace Relations

MEM04005C Produce moulds and cores by hand (jobbing)

Release: 1

MEM04005C Produce moulds and cores by hand (jobbing)

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers manual making (jobbing) of sand moulds and cores for metal casting typically in a working foundry. Moulds are made by an Engineering Tradesperson - Fabrication from specifications, instructions or drawings.
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Application of the Unit

Application of the unit	<p>This unit of competency applies to the production of sand moulds and cores by a foundry tradesperson often called a moulder using manual (jobbing) methods to produce metal castings. The unit does not cover machine moulding. The jobbing moulding methods covered by this unit apply to a range of materials and types of patterns and require matching of job specifications and patterns to mould and core production based on knowledge of the metal casting process.</p> <p>This unit has been developed for Engineering Tradesperson - Fabrication apprenticeship training and the recognition of trade level skills in the production of moulds and cores. The ability to match patterns, moulds and cores for a wide range of jobs is a key trade skill and can usually only be gained from experience in the range of work and the combination of on and off-the-job training typical of an apprenticeship.</p> <p>Where lifting and moving moulds and cores requires the use of mobile load shifting equipment or overhead cranes, appropriate manual handling units should also be selected. Where the securing of moulds requires welding skills, refer to MEM05012C Perform routine manual metal arc welding and MEM05050B Perform routine gas metal arc welding, as appropriate.</p> <p>Band: A</p> <p>Unit Weight: 16</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	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. Identify job requirements	1.1. Job requirements are correctly identified from drawings, instructions and specifications 1.2. Material is selected appropriate to job requirements
2. Determine sequence of operation	2.1. Sequence of operation including job set up is determined for maximum safety, efficiency and to meet job specifications
3. Select inspect and prepare pattern equipment	3.1. Pattern equipment is correctly identified from specifications to standard operating procedures 3.2. Pattern equipment is inspected to specifications, and damaged patterns are identified for repair or replacement to standard operating procedures 3.3. Pattern is assembled to specification 3.4. Pattern equipment is set up to specification according to standard operating procedures
4. Make mould and core	4.1. Core is positioned in prints utilising chaplets and chills as required and vented to specification according to standard operating procedures 4.2. Mould is closed and checked for compliance to component specification in accordance with standard operating procedures 4.3. Appropriate moulding/core making equipment is selected and positioned according to standard operating procedures 4.4. Appropriate moulding media is selected to produce mould and core to specification 4.5. Mould is secured according to standard operating procedures 4.6. Moulding media is used to produce mould and core according to standard operating procedures 4.7. Pouring basin is selected or manufactured to specification and positioned in accordance with standard operating procedures 4.8. Mould and cores are rammed up with joints and drawbacks as required to standard operating procedures 4.9. Parting and stripping systems are utilised in accordance with standard operating procedures 4.10. Loose pieces, vents, risers and runners are positioned and secured as required to standard operating procedures

ELEMENT	PERFORMANCE CRITERIA
	4.11. Pattern and loose pieces are removed from mould and core box in a safe manner least likely to cause damage to the pattern and in accordance with standard operating procedures 4.12. Mould is inspected and repaired as required 4.13. Mould and core is cleaned and painted according to specification using standard operating procedures
5. Clean and restore work area	5.1. All materials/debris is cleared and work site cleaned and left in a safe state 5.2. Unwanted treated sand is disposed of according to standard operating procedures and legislative and statutory requirements

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- interpreting written instructions, sketches and drawings
- assembling and positioning patterns in moulding boxes
- positioning ancillary methoding components
- preparing moulding media
- filling and compacting mould assemblies
- stripping patterns
- inspecting moulds
- finishing moulds
- positioning cores in prints
- closing moulds
- placing pouring basins
- securing moulds
- following oral instructions
- entering routine and familiar information onto proforma and standard workplace forms

Required knowledge

REQUIRED SKILLS AND KNOWLEDGE

Required knowledge includes:

- metal casting process
- variety of pattern types and their application in a casting process
- pattern assembly techniques
- selection of a moulding box to match job and pattern
- principles and processes for selection of ancillary components
- sand types and their bonding systems
- compaction processes
- parting and stripping systems
- mould requirements including vents, runners, risers and other methoding requirements
- finishing and closing techniques
- core placement
- pouring requirements
- securing systems
- pattern care and storage
- environmental requirements
- use and application of personal protective equipment
- foundry safe work practices and procedures
- hazards and control measures associated with producing moulds and cores by hand (jobbing)

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 produce a range of jobbing moulds and cores by hand. 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 apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include:

- following all safety procedures for working safely in a typical working foundry environment
- knowledge of the casting process including the role of patterns, sands, moulds and cores, and the importance of correct methoding
- matching of specifications, sketches and drawings to mould and core requirements for a range of patterns, metals and sands
- planning skills are evident in sequence of work, selection and layout of materials, and construction of moulds and cores
- appropriately identifying, assembling and determining patterns as fit for purpose
- ensuring core positioning is in accordance with job specifications
- placing methoding components in accordance with job specifications
- selecting moulding equipment and media to match a range of job requirements
- making moulds, cores and pouring basins for a range of jobs and metals efficiently and to meet all safety requirements with minimum waste of materials
- disposing of used sand and debris according to standard operating procedures and regulations.

Context of and specific resources for assessment

This unit has been developed to support training in and recognition of trade level jobbing moulding skills as applied to a jobbing moulding environment.

EVIDENCE GUIDE	
	<p>Assessment resources include a furnace to supply adequate molten metal for testing of moulds and cores, sand and other materials to enable enough sufficient moulds and cores to be produced and all normal foundry safety and personal protective equipment.</p> <p>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.</p>
Method of assessment	<p>The emphasis for assessment should be on jobbing ability, that is, the ability to produce moulds and cores for a variety of job specifications involving different metals, sands and patterns.</p> <p>A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit.</p> <p>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.</p> <p>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.</p>
Guidance information for assessment	<p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with producing jobbing moulds and cores by hand or other units requiring the exercise of the skills and knowledge covered by this unit.</p> <p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required</p>

EVIDENCE GUIDE

	knowledge, and be capable of applying the competency in new and different situations and contexts.
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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.

Materials

Materials may include:

- binders
- hardeners
- sand additives
- mould coatings

Patterns

Patterns may include:

- flatback
- uneven
- plated patterns
- multi-joint
- consumable
- split patterns
- loose piece patterns
- patterns requiring odd sides
- cored moulds
- drag and cope mould

Moulds

Moulds may include:

- flatback
- uneven jointed
- multi-part moulds

Cores

Cores may include full, half and segment cores

Mould securing methods

Mould securing methods may include:

RANGE STATEMENT	
	<ul style="list-style-type: none"> • weights • clamps • bolting
Moulding media	Moulding media may include use of a wide range of sands including green sand, shell sand and chemically bonded media
Pouring basins	Pouring basins may include hand and pattern formed
Parting and stripping systems	Parting and stripping systems may include dry and wet

Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units	

Competency field

Competency field	Casting and moulding
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