



**Australian Government**

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

# **MEM04002B Perform gravity die casting**

**Release: 1**

## MEM04002B Perform gravity die casting

### Modification History

Not Applicable

### Unit Descriptor

|                        |                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit descriptor</b> | This unit covers preparing equipment for die casting, manually pouring the metal, removing the material and cleaning the die. |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------|

### Application of the Unit

|                                |                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Application of the unit</b> | <p>This unit applies to gravity casting into permanent die. All work is carried out to predetermined specifications and standards of quality and safety.</p> <p>Metals used in this area may include aluminium, aluminium alloys and other non-ferrous and ferrous metals.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 2</b></p> |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

|                           |           |                                      |
|---------------------------|-----------|--------------------------------------|
| <b>Prerequisite units</b> |           |                                      |
| <b>Path 1</b>             | MEM13004B | Work safely with molten metals/glass |
|                           |           |                                      |

## Employability Skills Information

|                             |                                          |
|-----------------------------|------------------------------------------|
| <b>Employability skills</b> | 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. Prepare equipment        | <ul style="list-style-type: none"><li>1.1. Die coat is mixed in correct proportion.</li><li>1.2. Die temperatures are lifted to, or maintained, at the correct level.</li><li>1.3. Appropriate safety clothing and apparatus is used.</li><li>1.4. Die coat is applied in correct sequence and in a safe manner according to standard operating procedures.</li><li>1.5. Die is correctly located and closed.</li><li>1.6. Die is correctly placed on machine, toggle clamps are attached and done up to required torque.</li><li>1.7. Air cooling is attached to the die as specified if required.</li></ul> |
| 2. Carry out manual pouring | <ul style="list-style-type: none"><li>2.1. Pour is made in manner to reduce porosity and lamination.</li><li>2.2. Conditions are identified that contribute to inferior castings or rejects.</li><li>2.3. Allowance is made for adequate cooling time.</li><li>2.4. Pour is made at a continuous and appropriate rate during filling.</li><li>2.5. Monitoring of die coating condition is carried out and re-spraying occurs as required.</li></ul>                                                                                                                                                           |
| 3. Remove materials         | <ul style="list-style-type: none"><li>3.1. Parts are removed and stored in a manner that minimises damage. Any flash is removed from the die surface.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 4. Clean die                | <ul style="list-style-type: none"><li>4.1. Shot blaster is operated in a safe manner and according to standard operating procedures.</li><li>4.2. Chemical analysis of melt is taken and remedial action is applied as required to standard operating procedures.</li><li>4.3. Furnace is drossed and/or degassed to standard operating procedures.</li><li>4.4. Work area is cleaned of coating and shot residue to appropriate standard.</li></ul>                                                                                                                                                          |

## Required Skills and Knowledge

### 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:

- reading and interpreting routine information on written job instructions, specifications and standard operating procedures. May include drawings relating to gravity die casting
- mixing of die coats in the correct proportions in accordance with standard operating procedures
- maintaining of die at correct temperatures
- pouring of molten metal
- assessing correct curing times
- applying die coats
- removing of casting from die
- operating shot blaster
- using measurement skills needed to meet the requirements of this unit
- entering routine and familiar information onto proforma and standard workplace forms

**Required knowledge**

Look for evidence that confirms knowledge of:

- relevant written instructions
- die coat function(s) in gravity die casting
- correct proportions and consistency of die coats
- correct identification of die coat materials
- procedures for raising the temperature of the die to the correct level and maintaining the required temperature
- procedures to be followed when pouring molten metal to produce sound castings
- causes of defects in castings
- curing times for castings of various volumes and materials
- timing of die coat application and quantity of die coat to be used for different applications
- correct procedures for removing castings from the die and storing of castings
- die condition and need for shot blasting
- shot blaster operating procedures
- use and application of personal protective equipment
- safe work practices and procedures
- hazards and control measures associated with gravity die casting, including housekeeping



## 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 undertake gravity die casting. 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. Where assessment occurs off the job, i.e. the candidate is not in productive work, 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 gravity die casting 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.

#### Guidance information for

**EVIDENCE GUIDE****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.

|                                                  |                                                                                                                     |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Correct proportions</b>                       | Will be determined by manufacturer specifications                                                                   |
| <b>Die temperatures</b>                          | Will vary according to standard operating procedures and/or organisation's procedures                               |
| <b>Appropriate safety clothing and apparatus</b> | Aluminium Association safety status sheet recommendations, glasses, aluminised suits, masks, gloves, gauntlet, etc. |

**Unit Sector(s)****Unit sector****Co-requisite units**

|                           |  |
|---------------------------|--|
| <b>Co-requisite units</b> |  |
|                           |  |
|                           |  |

## Competency field

|                  |                      |
|------------------|----------------------|
| Competency field | Casting and moulding |
|------------------|----------------------|