



Australian Government

Department of Education, Employment and Workplace Relations

MEM04001B Operate melting furnaces

Release: 1

MEM04001B Operate melting furnaces

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers operating a metal melting furnace.
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Application of the Unit

Application of the unit	<p>This unit applies to the operation of singular or multi, coke, oil, gas fired or electric furnaces, the melting of a range of metals, and operational maintenance. Furnaces would primarily be used for continuous or staged bulk melting/smelting of metals, holding of hot liquids, or the melting of metals for production processes e.g. casting/moulding, galvanising, etc.</p> <p>Band: A</p> <p>Unit Weight: 4</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM13004B	Work safely with molten metals/glass

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. Select materials	1.1. Requisitions are completed as required according to standard operating procedures. 1.2. Charge analysis is undertaken in accordance with standard operating procedures. 1.3. The charge analysis is converted to furnace charge weight using standard operating procedures. 1.4. Charge is weighed according to standard operating procedures.
2. Start up furnace	2.1. Furnace is inspected for any defects or damage. 2.2. Routine operational maintenance of furnace is undertaken to standard operating procedures. 2.3. Furnace is started up to standard operating procedures. 2.4. Faults are reported according to standard operating procedures.
3. Charge furnace	3.1. Emergency/safety procedures are identified and followed as necessary. 3.2. Materials are pre-heated if required according to standard operating procedures. 3.3. Materials are charged into furnace using standard operating procedures. 3.4. Suitable areas for emergency unloading of molten metal are identified and kept available.
4. Monitor furnace	4.1. Furnace is maintained at optimum operating condition to standard operating procedures. 4.2. Sample for chemical analysis is taken and remedial action is applied as required to standard operating procedures. 4.3. Furnace is drossed and/or degassed to standard operating procedures. 4.4. Temperature of metal is checked and adjustment made if necessary.
5. Tap or unload the furnace	5.1. Quantity of the required metal is identified. 5.2. Tap rate is carried out to standard operating procedures. 5.3. Tapping or unloading is undertaken and completed safely according to standard operating procedures.
6. Shut down furnace	6.1. Shut-down of furnace is completed to standard operating procedures.

ELEMENT	PERFORMANCE CRITERIA
	6.2. Routine operational maintenance of furnace is undertaken to standard operating procedures.

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, standard operating procedures relevant test data sheets and other standard workplace forms. May include drawings for furnace operation
- following oral instruction
- entering routine and familiar information onto proformas and standard workplace forms
- identifying faults and areas for routine repair of the furnace and performing routine maintenance as necessary
- following procedures for starting and closing down the furnace
- deciding on charge materials
- weighing charge materials
- feeding materials into furnace
- measuring metal temperature and correcting as necessary
- sampling for chemical, carbon equivalent and wedge tests
- degassing as necessary
- deslagging/drossing
- tapping the metal

Required knowledge

Look for evidence that confirms knowledge of:

- refractory conditions, faults, and routine repair
- condition of cooling water supply
- starting procedures for different types of furnaces
- metallic charge materials and alloying elements
- weighing procedures and scale types
- correct order of loading of different charge materials
- thermocouple condition monitoring and adjustment mechanism for furnace

REQUIRED SKILLS AND KNOWLEDGE

- interpretation of carbon equivalent and wedge test results
- degassing procedures including tablet, lance and other procedures
- coagulant agents, application procedures and slag removal procedures
- close-down procedures
- applicable industry standards, national/Australian standards, NOHSC guides, State/Territory regulatory codes of practice/standards
- use and application of personal protective equipment
- safe work practices and procedures
- hazards and control measures associated with operating melting furnaces

Evidence Guide

EVIDENCE GUIDE	
<p>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.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to operate a melting furnace. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in 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 knowledge, and be capable of applying the competency in new and different situations and contexts.</p>
<p>Context of and specific resources for assessment</p>	<p>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.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with operating melting furnaces or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
<p>Method of assessment</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. 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>

EVIDENCE GUIDE

Guidance information for assessment	
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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.

Furnace

Singular or multi, coke, oil, gas fired or electric induction, arc and resistance furnaces

Operational maintenance

Routine lubrication, cleaning, routine repair/repointing of refractory

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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