



Australian Government

MEM48014 Recommend a refractory for an application

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM503A Recommend a refractory for an application.

Application

This unit of competency defines the knowledge and skills required to recommend a refractory for an application based on knowledge of the properties, application and modes of failure of the principal refractories.

It applies where a technician is involved with the development of a new product or process, or the improvement or redesign of an existing product or process. As part of this, the requirements for an appropriate refractory material will need to be considered and a recommendation as to the type of refractory which will be appropriate for the situation is made.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Metallurgy

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Identify job requirements from specifications, job sheets or work instructions
2. Identify the process requirements for a refractory	2.1 Identify the pH of the metallurgical slags 2.2 Determine the insulating requirements from the refractory 2.3 Determine other process requirements from the refractory

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.4 Identify likely process causes of refractory failure 2.5 Specify refractory needs in terms of physical and chemical properties required
3. Recommend type of refractory material	3.1 Select a refractory class suitable for the pH of the metallurgical slag 3.2 Shortlist refractory materials within that class suitable for the insulating and other process demands 3.3 Contrast the principal modes of failure for each short-listed refractory with the likely process causes of refractory failure 3.4 Recommend suitable refractory materials for the job
4. Consider economic and technical implications of different modes of installation	4.1 Compare possible alternative refractory materials 4.2 Compare possible alternative installation methods 4.3 Consider alternative materials with different installation methods and their overall technical and economic performance 4.4 Recommend a refractory material and a method of installation which delivers the best economic and technical performance for the application

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Principal refractories include:	• silica • alumino silicates • dolomite • magnesite-chrome • chrome-magnesite
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	• chrome • insulation and insulating refractories • special refractories including graphite and silicon carbide • monolithic refractories including cement, plastics, ramming mixes and castables.
Modes of installation includes one or more of the following:	• monolithic • fired shape structures • bricks • sprayed.

Unit Mapping Information

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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM48014 Recommend a refractory for an application

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- applying principles to determine the pH of metallurgical slags
- selecting appropriate refractories on at least two occasions for an application
- selecting appropriate method of refractory installation and repair on at least two occasions
- identifying root causes of refractory failures.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures
- metals and their properties and operating temperatures
- furnace operations
- refractory materials including:
 - purposes
 - common defects
 - installation
 - fixing techniques
- limitations of refractories
- modes of refractory installation.
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Assessment Conditions

- Assessors must:
 - have vocational competency in recommending a refractory for an application at least to the level being assessed with relevant industry knowledge and experience

- satisfy the assessor requirements in the Standards for Registered Training Organisations 2015 or its replacement and comply with the National Vocational Education and Training Regulator Act 2011, its replacement or equivalent legislation covering VET regulation in a non-referring State as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation and documentation including relevant workplace procedures, industry codes and standards.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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