



Australian Government

Department of Education, Employment and Workplace Relations

PMC557090A Select refractory materials for an application

Revision Number: 1

PMC557090A Select refractory materials for an application

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers confirming the application and conditions of use of the proposed refractory and then selecting the most appropriate materials for that use. It is intended for refractory experts who will most likely also have some management responsibility.
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Application of the Unit

Application of the unit	This unit of competency requires the application of knowledge about refractory properties and uses to the selection of an appropriate refractory material, or combination of materials for a specified end use. This unit does not involve the design of the refractory lining which is covered by <i>PMC557091A Design a refractory lining</i>. The units are obviously related and it may be appropriate to consider both concurrently. This unit applies to individuals who will be designing a refractory installation or component and may also be monitoring the installation of the refractory. They may be working in liaison with other refractory specialists or they may be the sole refractory specialist for this job/in their organisation. They will typically be liaising with a range of other technical experts as well as management and maybe accounts. This unit may apply to individuals working for an organisation which supplies and installs refractories, is a refractory consulting organisation or a client organisation which buys and uses the refractory.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		

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. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm required end use	1.1. Liaise with relevant stakeholders 1.2. Confirm the end use conditions for the refractory 1.3. Identify discrepancies or conflicts in requirements 1.4. Negotiate a consistent set of requirements for the refractory material
2. Shortlist appropriate refractory materials	2.1. Compare the properties of refractory materials with the set of requirements 2.2. Identify situations where the use of more than one material may be desirable 2.3. Rank possible materials solutions 2.4. Identify health, safety and environment (HSE) risks of top ranked possible material solutions 2.5. Estimate the cost of top ranked possible material solutions
3. Recommend a refractory material/ combination of refractory materials	3.1. Liaise with relevant stakeholders 3.2. Determine installation, repair or removal issues of relevance to the material selection 3.3. Review short list ranking 3.4. Recommend optimum material/combination of materials for the end use
4. Develop technical specification for recommended materials	4.1. Determine suitable format for specification 4.2. Prepare specification 4.3. Review specification with refractory designers and installer 4.4. Modify specification if required 4.5. Publish specification in required format to required people/organisations

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- solving problems
- communicating at all levels
- using organisation knowledge system
- analysing
- interpreting data
- negotiating
- technical reporting

Required knowledge

Required knowledge includes:

- properties of all common refractory materials
- typical limitations and applications of all common refractory materials
- installation methods and their impacts on material selection
- reasons for using more than one material for an application
- properties of combinations of materials and impacts on the specification of the materials
- heat transfer calculations (resistances in series and parallel)
- common refractory repairs and their impacts on material selection
- methods of reuse, recycling and disposal of refractories at the end of their life and the differences for different types of refractory material
- critical refractory specifications

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

Assessment of this unit should include demonstrated competence in a workplace based project or a simulated workplace project.

Access should be available to all normally accessed tables, data etc which would be available to and used by a competent refractory specialist performing this assignment.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to select an appropriate material and write the required specification.

Context of and specific resources for assessment

Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.

Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Method of assessment

- Assessment must satisfy the endorsed assessment guidelines of the Manufactured Mineral Products Training Package.
- Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge.
- Assessment methods which include direct observation of tasks should also include questioning on underpinning knowledge to ensure its correct interpretation and application.
- Assessment may be applied under project related conditions (real or simulated) and require evidence of

EVIDENCE GUIDE	
	process. • Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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. 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.

Stakeholders

Stakeholders may include:

- customer representatives
- technical experts
- regulators
- refractory designer
- refractory installer

End use conditions

End use conditions may include:

- surface temperature of refractory
- required temperature gradient through refractory/outside surface temperature
- chemical condition (e.g. pH)
- mechanical condition (e.g. impingement)
- temperature or other cycling)

Ranking of materials solution

Ranking should be based on:

- how well they meet the technical requirements of the end use

HSE risks

HSE risks should include focus on the comparative health, safety and environmental risks of the materials under consideration.

Risks would include risks during:

- installation
- use
- repair
- removal and disposal at end of life

Cost of materials

Cost of materials should be total costs and should include:

- raw material costs
- installation costs
- life cycle costs

Combination of materials

The term 'combination of materials' is used in this

RANGE STATEMENT	
	unit to mean any or all of: • mixing of more than one refractory material • use of refractory materials in series • use of refractory materials in parallel
Optimum materials	The optimum materials would be material or combination of materials which best delivers the technical requirement at the lowest cost and the least HSE risk

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		