



**Australian Government**

# **PMC557096A Specify and monitor the installation of block/precast refractories**

**Revision Number: 1**

## **PMC557096A Specify and monitor the installation of block/precast refractories**

### **Modification History**

Not applicable.

### **Unit Descriptor**

<b>Unit descriptor</b>	This unit of competency covers developing the specification for installing block or precast refractories and then monitoring that installation to ensure it complies with the specification. It is intended for refractory experts who will most likely also have some management responsibility.
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## Application of the Unit

<b>Application of the unit</b>	<p>This unit of competency requires the application of knowledge of refractory installation techniques to ensure the installation meets the requirements of the refractory. It covers the following types of refractory:</p> <ul style="list-style-type: none"> <li>• block</li> <li>• brick</li> <li>• precast.</li> </ul> <p>This unit does NOT cover the installation of monolithic/castable refractories, refer to <i>PMC557095A Specify and monitor the installation of monolithic/castable refractories</i>. While blocks/precast may also be used to make repairs, this unit may be used to include repairs using these techniques. The specification of the repair technique is covered in <i>PMC557097A Specify and monitor repairs to refractory installations</i>.</p> <p>This unit applies to individuals who may design a refractory installation and may also monitor the installation of refractory, or they may be installation specialists. 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.</p> <p>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.</p>
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## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Prerequisite units	

## Employability Skills Information

<b>Employability skills</b>	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 design specification	1.1. Check design specification against agreed set of requirements for the refractory 1.2. Identify discrepancies or conflicts in requirements 1.3. Confirm installation requirements and specifications
2. Design installation process	2.1. Determine refractory materials to be installed 2.2. Determine bond form to be used 2.3. Determine junctions and piers 2.4. Determine mortar requirements 2.5. Determine installation equipment requirements 2.6. Determine anchor requirements 2.7. Determine laying requirements 2.8. Design scaffolding or other internal access needs if required 2.9. Design external access/egress means if required 2.10. Identify installation health, safety and environment (HSE) hazards 2.11. Determine appropriate hazard controls 2.12. Check for discrepancies or conflicts in the designs and take appropriate action
3. Prepare for installation	3.1. Specify installation procedure 3.2. Liaise with relevant stakeholders 3.3. Modify specification if needed 3.4. Ensure correct ordering of requirements 3.5. Identify time critical items for the installation 3.6. Identify other items critical to the success of the project 3.7. Identify or develop measures to monitor all critical items 3.8. Prepare installation specification
4. Monitor installation	4.1. Ensure requirements meet specification/contract 4.2. Ensure hazard controls are in place and effective 4.3. Monitor work to installation specification 4.4. Take appropriate action on non-conformances as required 4.5. Report during project as required 4.6. Complete end of project documentation on completion

## 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
- investigating
- analysing
- interpreting data
- negotiating
- technical reporting

#### Required knowledge

Required knowledge includes:

- properties of all common refractory materials
- block/precast installation methods
- installing for:
  - straight walls
  - corners
  - curves
  - roofs
  - arches
- anchors and anchoring systems
- installation equipment such as lifting and placement aids
- post placement requirements for different mortars
- scaffolding design and construction
- relevant terms
- relevant calculations
- project planning and management

## 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

<b>EVIDENCE GUIDE</b>	
	<p>process.</p> <ul style="list-style-type: none"><li>• 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.</li><li>• Assessment may be in conjunction with assessment of other units of competency where required.</li></ul>
<b>Guidance information for assessment</b>	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

<b>RANGE STATEMENT</b>	
<p>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.</p>	
<b>Refractory materials</b>	<p>Refractory materials may include one or more of:</p> <ul style="list-style-type: none"> <li>• cementitious refractories</li> <li>• clay refractories</li> <li>• other refractories</li> </ul>
<b>Bond forms</b>	<p>Bond forms include:</p> <ul style="list-style-type: none"> <li>• stretcher bond</li> <li>• header bond</li> <li>• English bond</li> <li>• English garden wall bond</li> <li>• reverse bond</li> <li>• broken bond</li> </ul>
<b>Junctions and piers</b>	<p>Junctions include:</p> <ul style="list-style-type: none"> <li>• tie brick</li> <li>• special brick</li> <li>• squint brick</li> </ul> <p>Piers may be:</p> <ul style="list-style-type: none"> <li>• attached</li> <li>• detached</li> <li>• not needed</li> </ul> <p>Note: feather edge refractory bricks are not normally included</p>
<b>Mortar</b>	<p>Mortar includes:</p> <ul style="list-style-type: none"> <li>• hydraulic setting dry mixes</li> <li>• air setting dry mixes</li> <li>• heat setting dry mixes</li> </ul> <p>and may be:</p> <ul style="list-style-type: none"> <li>• clay</li> <li>• fireclay</li> <li>• chamotte</li> <li>• mortar</li> </ul>

<b>RANGE STATEMENT</b>	
<b>Installation equipment</b>	<p>Installation equipment may include one or more of:</p> <ul style="list-style-type: none"> <li>• equipment for lifting and placing precast blocks</li> <li>• temporary support for roofs and arches</li> <li>• spreader jacks</li> </ul>
<b>Anchors</b>	<p>Types of anchors may include:</p> <ul style="list-style-type: none"> <li>• anchor bolts</li> <li>• anchor mesh</li> <li>• retention clips</li> </ul>
<b>Post laying requirements</b>	<p>Post laying requirements may include:</p> <ul style="list-style-type: none"> <li>• drying</li> <li>• control of moisture and or temperature</li> <li>• removal of scaffolding or other access/egress provisions</li> </ul>
<b>HSE hazards</b>	<p>HSE hazards may include:</p> <ul style="list-style-type: none"> <li>• exposure to heat</li> <li>• exposure to dust</li> <li>• exposure to refractory materials</li> <li>• confined space entry</li> <li>• working with equipment</li> <li>• working at heights</li> <li>• ultra-violet (UV) and other welding hazards</li> <li>• disposal of waste, scrap and excess materials</li> <li>• manual handling hazards</li> </ul>
<b>Hazard control</b>	<p>Appropriate hazard control should be determined by:</p> <ul style="list-style-type: none"> <li>• applying the hierarchy of control</li> </ul>
<b>Stakeholders</b>	<p>Stakeholders may include:</p> <ul style="list-style-type: none"> <li>• customer representatives</li> <li>• technical experts</li> <li>• regulators</li> <li>• refractory designer</li> <li>• materials and equipment suppliers</li> <li>• contractors</li> </ul>
<b>Requirements</b>	<p>Requirements include:</p>

<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• materials</li> <li>• equipment</li> <li>• contractors</li> </ul>
<b>Time critical items</b>	<p>Time critical items are those items which if not completed on time will cause the project to run overtime and may be determined from:</p> <ul style="list-style-type: none"> <li>• critical path analysis</li> <li>• long lead time items</li> <li>• other techniques</li> </ul>
<b>Installation specification</b>	<p>Installation specification should include:</p> <ul style="list-style-type: none"> <li>• technical specification</li> <li>• hazard controls and residual hazards</li> <li>• installation schedule</li> <li>• measures monitoring critical items</li> </ul>
<b>End of project documentation</b>	<p>End of project documentation may include:</p> <ul style="list-style-type: none"> <li>• operating and/or maintenance procedures</li> <li>• technical specification</li> <li>• routine monitoring requirements</li> <li>• project review report: <ul style="list-style-type: none"> <li>• what was intended</li> <li>• what was achieved</li> <li>• achieved costs</li> <li>• achieved timing</li> <li>• significant project issues</li> <li>• possible improvements</li> </ul> </li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	Operational/technical
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## Competency field

Competency field	
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## Co-requisite units

Co-requisite units		