



Australian Government

Department of Education, Employment and Workplace Relations

CPCCB4042A Construct a fire brick wall and arch using refractory materials

Release: 1

CPCCB4042A Construct a fire brick wall and arch using refractory materials

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit of competency specifies the outcomes required to construct a brick wall and arch using refractory materials, including castables, bricks and insulation. It covers the application of the unique skills and knowledge relevant to refractory work.

Application of the Unit

Application of the unit This unit of competency supports specialist and advanced tradespersons working in refractory bricklaying. It may be applied in the construction or repair of various fire resistant structures, including boilers, kilns and industrial furnaces.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills 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. Set out and prepare the base location of work.	1.1. Location of the brickwork is set out to position in accordance with job specifications and drawings. 1.2. Base location is prepared so that the surface is dry, horizontal, clean and flat, and in accordance with job specifications.
2. Lay brickwork.	2.1. Fire clay is applied to bricks to maintain joints at the specified thickness. 2.2. Bricks are in the required bond and set out, method and line, level and plumb in accordance with job specifications and drawings. 2.3. Bricks are cut to the correct length to maintain the required bond in accordance with manufacturer recommendations and job specifications. 2.4. Brickwork is completed with surplus fire clay removed to specification requirements.
3. Form a segmental arch.	3.1. Span and rise of the arch are identified and located in accordance with job plans and specifications. 3.2. Adjustable props are placed appropriately to support the timber arch centre, and adjusted as necessary. 3.3. Position of the central key brick is established and marked for easy identification.
4. Cut and lay bricks to position around the arch.	4.1. Bricks are cut and laid on the centre to form an arch to specifications. 4.2. Same sized wedge shape brick is maintained throughout the construction of the arch. 4.3. Measurements and placement of bricks are monitored and adjusted accordingly to ensure accurate application of job requirements.
5. Complete and review finished work.	5.1. Props and other support materials are removed. 5.2. Construction is finished and cleaned to meet job requirements and professional expectations. 5.3. Intrados of the arch is cleaned and repointed with mortar as necessary.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

REQUIRED SKILLS AND KNOWLEDGE

Required skills

Required skills for this unit are:

- ability to use tools and equipment employed in refractory work
- ability to apply materials accurately and to required tolerances and specifications
- communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - communicate technical issues
 - communicate with the team
 - consult with architect and stakeholder
 - read and interpret:
 - documentation from a variety of sources
 - plans, specifications and drawings
 - use and interpret non-verbal communication
 - use language and concepts appropriate to cultural differences
- numeracy skills to apply measurements and calculations
- organisational skills, including the ability to plan for and set out work
- relevant application techniques specific to the laying and installation of refractory materials
- teamwork skills and the ability to work with others to ensure coordination and cooperation between self and others
- technical skills to select and use relevant tools and equipment.

Required knowledge

Required knowledge for this unit is:

- Building Code of Australia (BCA) and other Australian standards relevant to the nature of work and materials being used
- characteristics and applications of different materials used in refractory brick work
- methods and processes relating to the use of refractory bricks and insulation materials for the construction of fire resistant structures
- organisational procedures for the acquisition and storage of materials
- workplace and equipment safety requirements, including relevant statutory regulations, codes and standards.

Evidence Guide

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

This unit of competency could be assessed by constructing a fire brick wall and arch. This work may include a 230mm fire brick wall to incorporate an opening (600mm x 600mm) with a segmental arch above, a minimum of 1.5m long and 1.2m high to the top of the arch.

This unit of competency can be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.

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

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- demonstrate understanding of the purpose and application of refractory bricklaying
- comply with OHS regulations applicable to workplace operations
- use safe and effective procedures to handle hazardous materials
- apply organisational quality procedures and processes within context of constructing or repairing structures employing refractory materials
- read and interpret two-dimensional refractory plans and specifications
- select and use processes, tools and equipment appropriate to the job requirements
- prepare materials and samples in accordance with job requirements
- identify typical faults and problems with materials and equipment that occur and necessary action taken to rectify
- communicate effectively with others to ensure safe work site operations.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

EVIDENCE GUIDE

Assessment of essential underpinning knowledge will usually be conducted in an off-site context. Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- materials appropriate to refractory brickwork
- plant, tools and equipment relevant to refractory brickwork.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge

EVIDENCE GUIDE

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

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.

Job specifications and drawings include:

- detailed plans showing aspects and sections of the structure in greater detail than the general plan
- general plans showing the entire structure to be constructed.

Required bond includes:

- header bond
- stretch bond.

Adjustable props include:

- metal props
- packers
- timber toms
- timber wedges.

Adjusted supports:

- ensure the arch centre is level at right angles to the wall face and level across the springing line.

Wedge shape bricks include the following common sizes:

- 51mm
- 63mm

RANGE STATEMENT

Measurements and placement
include:

- 69mm.
- accurate positioning and maintenance of the centreline of the key brick is through the vertical centre line of the arch ensuring:
 - all bricks are cut and laid to maintain even joints
 - even joint thickness around the extrados.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area