



Australian Government

PMC552094 Prepare for and apply shotcrete for installation

Release: 1

PMC552094 Prepare for and apply shotcrete for installation

Modification History

Release 1. Supersedes and is equivalent to PMC552094B Prepare for and apply shotcrete for installation

Application

This unit of competency covers the skills and knowledge required to prepare for and apply shotcrete refractory installation. Shotcrete is the generic term used to describe the placement of cementitious products, such as concrete or refractory monolithics, by high volume and high velocity air. It is also known as guniting.

This unit of competency applies to installation with shotcrete alone and with shotcrete that needs to join to brick/block, moulded or cast refractory. The refractory may be applied by wet or dry processes.

This unit of competency applies to operators who are required to prepare for and apply shotcreting to procedures and specifications, mix the shotcrete, correct any deficiencies in the quality of work and identify and take action on any problems.

This unit of competency applies to an individual working alone or as part of a team or group and working in liaison with other shift team members, team leader and supervisor, as appropriate.

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

Pre-requisite Unit

Nil

Competency Field

Operations

Unit Sector

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | | | |
|---|----------------------|-----|---|
| 1 | Establish the | 1.1 | Check all information conforms with resources |
|---|----------------------|-----|---|

	suitability of resources	1.2	Record discrepancies in information
		1.3	Report any inaccuracies in information to the person in charge
		1.4	Identify and select materials, components, tools and equipment
2	Apply shotcrete to prepared surface	2.1	Prepare backgrounds, cutting out, demolition and keying
		2.2	Mix shotcrete
		2.3	Assemble and operate shotcreting equipment
		2.4	Apply shotcrete
		2.5	Remove and reinstate damaged shotcrete material
		2.6	Maintain tools and equipment
3	Contribute to controlling hazards in work area	3.1	Identify hazards in work area
		3.2	Assess risks arising from those hazards
		3.3	Take appropriate action to control risks to procedures and duty of care
4	Respond to problems	4.1	Identify possible problems in equipment or process
		4.2	Determine problems needing action
		4.3	Determine possible fault causes
		4.4	Rectify problem using appropriate solution within area of responsibility
		4.5	Follow through items initiated until final resolution has occurred
		4.6	Report problems outside area of responsibility to designated person

Foundation Skills

This section describes those required skills (language, literacy and numeracy) 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.

Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, equipment and production processes and hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- manufacturer's technical information
- job cards
- drawings
- emergency procedures

- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of:

- damaged/worn tools/equipment
- incorrect tools/equipment for job
- incorrect/incomplete information for job
- variations in materials
- preparation problems.

Known solutions are drawn from one or more of:

- procedures
- training
- remembered experience.

Non-routine problems must be reported according to according to relevant procedures.

Tools and equipment

Tools and equipment include:

- mixing equipment
- air compressors
- water addition equipment
- gunning equipment/nozzles
- equipment allowing access.

Hazards

Hazards must be identified and controlled. Identifying hazards requires consideration of:

- heat, smoke, dust, vapours or other atmospheric hazards
- weight, shape, volume of materials to be handled

- hazardous products and materials
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- electricity
- gas
- gases and liquids under pressure
- noise
- rotational equipment or vibration
- plant services (steam, condensate, cooling water, etc)
- structural hazards
- equipment failures
- machinery, equipment and product mass
- limited head spaces or overhangs
- working at heights
- working in restricted or confined spaces
- other hazards that might arise.

Records and reports Records include one or more of:

- log books/sheets
- electronic records
- job/work sheets
- other records used for the smooth running of the plant.

Reports include one or more of:

- paper or electronic-based logs and reports
- verbal/radio reports
- reporting items found which require action.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMC552094B Prepare for and apply shotcrete for installation

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>

Assessment Requirements for PMC552094 Prepare for and apply shotcrete for installation

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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 demonstrate the ability to:

- read and interpret manufacturer's technical information, job sheets, procedures, material labels and safety information
- confirm information/procedures are available and conform with resources
- identify and select materials, components, tools and equipment
- use and maintain tools and equipment
- mix and apply shotcrete to achieve required specifications
- monitor key variables, including:
 - uniformity and thickness of course
 - consistency of mix
 - correct compaction
 - conforming to required curves and angles
 - adhesion to surface
 - tying to structure
 - keying to existing refractory
 - cutting requirements
 - support requirements
- monitor installation integrity and conformance to specification and make adjustments to meet specifications
- recognise routine and non-routine problems
- identify when the operator is able to rectify problems, when assistance is required and who is the appropriate source for assistance
- take action to resolve problems or report them to appropriate personnel
- distinguish between possible causes of routine problems, including:
 - raw material variations
 - equipment faults/abnormalities
 - process/procedure errors
- identify hazards and apply relevant hazard controls
- apply safety procedures
- communicate effectively with team/work group and supervisors
- complete workplace records

- do basic arithmetical manipulations, including additions, subtractions, divisions, fractions and percentages.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to operate under routine only supervision and to solve routine problems, including knowledge of:

- types, uses and operation of shotcreting equipment
- types and characteristics of shotcreting materials
- methods of mixing and applying shotcreting materials
- methods of avoiding lamination of applied shotcreting materials
- methods of protecting applied shotcreting material during application and curing
- types and methods of finishing the surface of the shotcrete
- methods of curing shotcrete
- types and characteristics of background surfaces and their preparation methods
- types, uses and operation of tools and equipment
- methods of preparing background surfaces
- types, uses and operation of tools and equipment
- reasons for, and timing of, dedicated curing and heat-up programs and the consequences of the installed concrete if the program is not correctly followed
- types and uses of temporary support/formwork
- methods of protecting work during installation
- reasons for, and methods of, providing test panels
- methods of cutting
- safeguards to take during reinstatement
- methods of removing damaged refractory
- methods of keying and bonding new to existing refractories
- reasons for, and methods of, obtaining seals between new and existing refractory
- routine problems, their probable causes and relevant corrective actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant

- will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
- must include the use of an appropriate industrial item/s of equipment requiring demonstration of operation, start-up and shutdown procedures and responding to problems
- may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should 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. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
 - walk-throughs
 - pilot plant operation
 - industry-based case studies/scenarios
 - 'what ifs'.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process such as workbooks, written assessments or interviews (provided a record is kept).
- 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.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions

- appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on the job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

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