



Australian Government

Department of Education, Employment and Workplace Relations

PMC557092A Specify and interpret refractory tests

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the analysis of specifications and possibly contracts to determine what technical information is required, specifying the appropriate testing regime to deliver the required data and then interpreting that data to obtain the required information.
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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 and refractory testing to the acquisition of information about the relevant properties of a refractory. This unit does NOT involve the doing of the tests which is covered by <i>MSAL974005A Perform physical tests</i> or other relevant units in the Laboratory Operations qualifications. 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. The specification of the testing regime may form part of the refractory specification. 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. Determine information required from tests	1.1. Analyse relevant documents for any test information requirements 1.2. Liaise with relevant stakeholders to determine test information requirements 1.3. Confirm the end use conditions for the refractory 1.4. Identify discrepancies or conflicts in requirements 1.5. Negotiate a consistent set of test information requirements
2. Specify required tests	2.1. Determine data required to yield the required information 2.2. Determine range of tests and test methods which will yield that data the set of requirements 2.3. Make a preliminary selection of tests which will provide required data 2.4. Identify health, safety and environment (HSE) risks of possible tests 2.5. Estimate the cost of possible tests 2.6. Confirm test data will yield information required by stakeholders 2.7. Specify preferred range of tests and test methods to provide required data
3. Specify sampling regime	3.1. Identify sample requirements of specified tests 3.2. Determine sampling frequency required to meet information requirements 3.3. Draft sampling regime 3.4. Liaise with relevant stakeholders in relation to sampling regime 3.5. Negotiate changes to sampling regime and/or information requirements as required. 3.6. Finalise testing and sampling regime
4. Interpret test data	4.1. Inspect test data for anomalies or discrepancies and take required action 4.2. Determine required information from test data 4.3. Analyse information as required 4.4. File and report information as required 4.5. Take appropriate action based on information

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:

- data produced from all common refractory tests
- standard test methods applicable to all common refractory tests
- benefits and limitations of test methods and tests
- applicability of test data to refractory service
- maths and statistics relevant to the tests and test methods
- methods of determining information from test data

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.

Relevant documents

Relevant documents may include:

- specifications
- contracts
- designs
- design briefs
- information about refractory failures
- other communications from stakeholders

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

Range of tests

Tests to include:

- compression
- modulus of rupture
- thermal conductivity
- density
- porosity/permeability
- abrasion
- thermal expansion
- refractoriness

Test methods

Test methods include:

RANGE STATEMENT	
	- Standards Australia (SAA) - International Organisation for Standardisation (ISO) - ASTM International - Joint Support Office (JSO)/Deutsches Institut für Normung (DIN)
Preliminary selection of tests	Preliminary selection should be based on: how well they meet the technical requirements
HSE risks	HSE risks should include focus on the comparative health, safety and environmental risks of the tests under consideration. Risks would include risks during: - sampling - testing equipment and conditions - sample retention of required test - disposal of discarded sample and test piece
Cost of test	Cost of materials should be total costs and should include: - cost of sample - cost of sampling - capital and recurrent cost of test - cost of data interpretation
Preferred range of tests and test methods	The preferred range of tests and test methods would be: those tests which best deliver the technical requirement at the lowest cost and the least HSE risk
Determining information and analysing information	Determining information and analysing information may require: the undertaking of calculations, drawing of graphs and the application of statistics

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		