



Australian Government

PMC557092 Specify and interpret refractory tests

Release: 1

PMC557092 Specify and interpret refractory tests

Modification History

Release 1. Supersedes and is equivalent to PMC557092A Specify and interpret refractory tests

Application

This unit of competency covers the skills and knowledge required to specify and interpret refractory tests.

This unit of competency applies to operators who are required to determine the information needed from tests, specify the data, test methods and sampling regime, and interpret the data to obtain the required information.

This unit of competency applies to senior technicians or those in similar roles who are required to analyse and synthesise advanced theoretical and technical knowledge and apply independent judgement to high-level technical issues and complex problems. The individual may work in liaison with other refractory specialists or they may be the sole refractory specialist for this job or in their organisation.

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

Pre-requisite Unit

Nil

Competency Field

Technical

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 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 environmental (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

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:

- 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.

HSE and other risks Identification of HSE and other risks includes consideration of:

- health and safety risks
- sustainability risks

- regulatory risks
- business risks.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMC557092A Specify and interpret refractory tests

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 PMC557092 Specify and interpret refractory tests

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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:

- analyse and interpret designs/design briefs, contracts, technical reports, technical specifications and data
- confirm requirements for refractory end use conditions, including:
 - 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
- communicate technical information verbally and in writing/drawings
- communicate with internal and external stakeholders, including one or more of:
 - customer representatives
 - technical experts
 - regulators
 - management
 - refractory designer
 - refractory installer
- identify range of possible test methods from sources, including Standards Australia (SAA), International Organisation for Standardisation (ISO), ASTM International, Joint Support Office (JSO), and Deutsches Institute fur Normung (DIN)
- identify range of possible test methods for compression, modulus of rupture, thermal conductivity, density, porosity/permeability, abrasion, thermal expansion and refractoriness
- determine optimum sampling and testing regime by evaluating criteria, including:
 - alignment to technical requirements of the end use
 - preliminary design calculations
 - installation, repair or removal issues
 - cost (e.g. cost of sample and sampling, capital/recurrent costs, and data interpretation)
 - health, safety and environmental (HSE) risks (e.g. related to sampling, testing equipment and conditions, sample retention and disposal)
 - relative suitability/costs/risks of possible test methods

- inspect and analyse test data to determine required information and take action based on the information
- negotiate with relevant stakeholders and document agreed requirements and testing and sampling regime
- apply complex and/or theoretical mathematical calculations, statistics, develop/interpret graphs
- solve complex problems to determine tests which best deliver the technical requirement at the lowest cost and the least HSE risk.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to fulfil their job role, including knowledge of:

- 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
- regulatory framework
- 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.
- It may be appropriate to assess this unit in conjunction with:
 - *PMC557091 Design a refractory lining.*
- The collection of performance evidence is best done from a report and/or folio of evidence drawn from:
 - a single project which provides sufficient evidence of the requirements of all the elements and performance criteria
 - multiple smaller projects which together provide sufficient evidence of the requirements of all the elements and performance criteria.
- A third-party report, or similar, may be needed to testify to the work done by the individual, particularly when the project has been done as part of a project team.

- Assessment should use a real project in an operational workplace. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur using 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 or through an independent process, such as workbooks, written assessments or interviews.
- 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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