Australian Government

Assessment Requirements for PMC557093 Design a refractory/ceramic component

Release: 1

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

Assessment Requirements for PMC557093 Design a refractory/ceramic component

Modification History

Release 1. Supersedes and is equivalent to PMC557093A Design a refractory/ceramic component

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 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 material selector
  - refractory installer
- determine optimum refractory installation by evaluating criteria, including:
  - alignment to technical requirements of the end use
  - preliminary design calculations
  - installation, repair or removal issues
  - cost (material, manufacturing, installation, repair, life cycle)
  - health, safety and environmental (HSE) risks (manufacture, installation, use, repair, removal and disposal)
  - relative benefits/costs/risks of block/precast, monolithic/castable, gunite/shotcrete, refractory coating and multilayer (e.g. hard face over insulating refractory) refractory linings
- negotiate with relevant stakeholders and document agreed requirements and design and technical specifications
- apply complex and/or theoretical mathematical calculations
- solve complex problems to determine design and specification which best deliver the technical requirement at the lowest cost and the least HSE risk
- develop technical drawings manually or with computer-aided drafting (CAD).

Knowledge Evidence

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

- properties of all common refractory materials
- typical limitations and applications of all common refractory materials when used as components
- manufacturing methods for refractory components and their advantages, disadvantages, typical uses and limitations
- heat transfer calculations (resistances in series and parallel)
- mechanical calculations (stress/strain, modulus, stiffness, shear, strength of refractory materials and physical properties of refractory materials)
- thermal expansion (calculation of and allowance for)
- methods of fixing refractory components to products
- basic metal product manufacturing methods, their possible uses for refractory components and their impact on component design
- methods of reuse, recycling and disposal of refractory components at the end of their life and the differences for different types of refractory components
- critical refractory component specifications
- 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:
  - *PMC557090 Select refractory materials for an application*.
- 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.

Links

MSA Training Package Implementation Guides - http://mskills.org.au/training-packages/info/