



Australian Government

**Assessment Requirements for MEM48031
Select ceramic and glass materials for
engineering and manufacturing
applications**

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Modification History

Release 1. New unit.

Performance Evidence

There must be evidence the candidate has demonstrated the ability to:

- follow work instructions, standard operating procedures (SOPs) and safe work practices
- identify and interpret specifications, drawings, job sheets and other applicable reference documents for selecting two ceramic and two glass materials
- research common engineering ceramic and glass materials by their required properties for a specific application on at least two occasions
- select and carry out tests appropriate to the material
- arrange tests appropriate to the ceramic material and analyse the results on at least two occasions
- verify selection of ceramic and glass materials.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- general non-crystalline material features including short-range order and relationship to glasses and gels
- the vitreous or glassy state and the basic structural unit SiO_4 tetrahedra
- properties of silica (SiO_2) and quartz including vitreous or fused silica
- safe working practices to take into account when selecting silica and quartz materials for an application
- engineering ceramics:
 - glass ceramics and applications
 - causes of ceramic cracking under temperature
 - binary (e.g., $\text{MgO-Al}_2\text{O}_3$) and ternary ceramic diagrams)
- processes for manufacture of ceramic articles including:
 - raw materials
 - effect of water
 - shaping by pressure fabrication,
 - hydroplastic forming and slip casting
 - drying and shrinkage

- sintering (firing) and associated shrinkage
- glass properties including:
 - viscosity
 - mechanical properties
 - optical properties
- glass formers, glass modifiers and intermediates and their role in glass structure
- glass treatments including tempering and annealing
- devitrification of glass and its effects on glass properties
- tests used to determine ceramic and glass properties.
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Assessment Conditions

- Assessors must:
 - have vocational competency in selecting ceramic and glass materials for engineering and manufacturing applications at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015 or its replacement* and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring State as the case requires.
- Where possible, assessment must 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 that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- There must be suitable access to an operating plant or equipment that allows for appropriate and realistic simulation and documentation including relevant workplace procedures, industry codes and standards.
- 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.
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Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>