



Australian Government

MEM48031 Select ceramic and glass materials for engineering and manufacturing applications

Release: 1

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Modification History

Release 1. New unit.

Application

This unit of competency defines the skills and knowledge required to recognise common ceramic and glass materials used in engineering, assist in the selection of a ceramic or glass material for a specific application, and use test results to evaluate the properties of ceramics and glass materials.

It applies to technicians and supervisors in manufacturing and engineering environments who are required to select or assist in the selection of ceramic and glass materials.

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

Pre-requisite Unit

Nil.

Competency Field

Materials

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.4 Identify job requirements from specifications, drawings, job sheets or work instructions
2. Identify ceramic and glass materials by their principal properties	2.1 Identify the principal properties of ceramic and glass materials used in engineering and manufacturing applications 2.2 Identify the effects of different types of bonding in ceramic and glass

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	materials 2.3 Identify the effects of mechanical and thermal processes on the principal properties of ceramic and glass materials
3. Select ceramic and glass materials for specific applications	3.1 Determine the ceramic or glass requirement for the specific application in consultation with others 3.2 Select ceramic or glass material based on the requirement and consideration of principal properties and further processing 3.3 Confirm selection according to standard operating procedures
4. Verify ceramic or glass material as fit for purpose	4.1 Identify appropriate tests for the required properties 4.2 Arrange required testing of materials with appropriate persons 4.3 Analyse test results and confirm or modify material choices based on testing outcomes

Foundation Skills

This section describes those language, literacy, numeracy and employment skills 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.

Common ceramic and glass materials and properties include:	- ceramic materials including: - raw materials: clays, flints, feldspars, - ceramic structures of AX type with various coordination numbers - SiO₄ tetrahedra based structural materials and industrial ceramic products - silica SiO₂ and quartz - glass materials and properties including:
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	• vitreous or glassy state and the basic structural unit SiO₄ tetrahedra • glass formers, glass modifiers and intermediates • viscosity • mechanical properties • optical properties • tempered glass • annealed glass, effect of compression stresses in surface material • explain devitrification of glass and accompanying changes in properties, glass ceramics and applications.
Appropriate tests include those:	• undertaken by a technician within the organisation • required to be undertaken by external organisations.
Appropriate tests include tests for one or more of:	• tensile strength • compression • shear characteristics • torsion • hardness • impact resistance • fatigue resistance • creep resistance • visual appearance and colour • magnetic properties • corrosion resistance.
Appropriate persons include:	• internal technicians, scientists, engineers or other technical experts • external organisations.

Unit Mapping Information

No equivalent unit

Links

Companion Volume implementation guides are found in VETNet -

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