



Australian Government

MEM30007 Select common engineering materials

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM30007A Select common engineering materials.

Application

This unit of competency defines the skills and knowledge required to identify and select common engineering materials including ferrous metals, cast irons, carbon and alloy steels, stainless steels, coated steels, nonferrous metals, aluminium and its alloys, copper and its alloys, nickel alloys, zinc, titanium, magnesium, refractory metals, polymers, thermosetting polymers, thermoplastic polymers, ceramics and glasses.

This unit applies to technician level activities in manufacturing and engineering environments. It covers identifying common materials used in engineering by their principal properties. All work is carried out under supervision.

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

Pre-requisite Unit

Nil

Competency Field

Engineering technician

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Identify common engineering materials by their principal properties	1.1 Follow standard operating procedures (SOPs) and comply with work health and safety (WHS) requirements at all times 1.2 Identify the principal properties of common engineering materials 1.3 Identify the effects of different types of bonding in materials 1.4 Identify the effects of mechanical and thermal processes on the principal properties of materials
2. Select materials for specific applications	2.1 Determine the engineering requirement for the specific application in consultation with others

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.2 Select materials based on the requirement and consideration of principal properties and further processing 2.3 Confirm the selection
3. Verify selected material as fit for purpose	3.1 Identify appropriate tests for the required properties 3.2 Arrange testing of materials with appropriate personnel based on job requirements 3.3 Obtain and analyse test results and confirm material choices or modify as appropriate

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.

Classification of materials includes:	- metals and non-metals - ferrous and nonferrous metals - polymers - ceramics - composite materials.
Common engineering materials include:	- ferrous metals: - cast irons - carbon and alloy steels - stainless steels - coated steels - nonferrous metals: - aluminium and its alloys - copper and its alloys

	• nickel alloys • zinc • titanium • magnesium • refractory metals • polymers: • thermosetting • thermoplastic • elastomers • ceramics • glasses.
Appropriate tests include:	• those undertaken by a technician within the organisation • those required to be undertaken by external organisations • simple tests.
Physical properties include one or more of the following:	• electrical conductivity/resistivity • specific gravity/density • thermal conductivity/expansion • specific heat • melting • boiling points.
Mechanical properties include:	• strength: • yield • tensile • compressive • shear characteristics • torsion • hardness • impact resistance • fatigue resistance • elasticity • plasticity • ductility • malleability • creep resistance • visual appearance and colour • magnetic properties • corrosion resistance.
Material tests include:	• tensile • compressive • shear

	• torsion • hardness • impact • fatigue • creep • visual • corrosion testing.
Mechanical and thermal processes include:	• casting • forging, rolling and extrusion • cold forming • powder processes • heat treatment • joining - fasteners • soldering • brazing • welding • adhesives • finishing including coatings, metallic and non-metallic.
Chemical properties include:	• corrosion of metals including corrosion processes and mechanisms • degradation of polymers.
Bonding includes:	• ionic • covalent • metallic • molecular.
Appropriate personnel include one or more of the following:	• internal technicians • external organisations.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM30007A Select common engineering materials.

Links

Companion Volume Implementation Guides are available on VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>