



Australian Government

**MEM48032 Select composite materials for
engineering and manufacturing
applications**

Release: 1

MEM48032 Select composite materials for engineering and manufacturing applications

Modification History

Release 1. New unit.

Application

This unit of competency defines the technical skills and knowledge required to recognise and select composite materials for engineering and manufacturing applications, including use of test results to evaluate the suitability of composite materials for an application.

The unit applies to composite material selection tasks. The unit applies to the requirement for undertaking a formal evaluation process that considers the technical requirements of both the composite product and the manufacturing process.

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. Identify common composite materials by their principal properties	1.1 Identify the principal properties of composite resins, reinforcing and core materials 1.2 Identify the effects of different types of bonding in composite materials 1.3 Identify the effects of mechanical and thermal processes on the principal properties of composite materials 1.4 Identify common failures of composite materials and relationship to manufacturing errors, wear and usage 1.5 Identify the effects of different types of reinforcing and core materials in composite materials

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
2. Determine requirements for composite materials selection	<p>2.1 Review design specifications, drawings, job sheets or work instructions for composite material function, performance, commercial and environmental parameters</p> <p>2.2 Review reference information for relevant data on composite parameters</p> <p>2.3 Prepare list of constraints and objectives for composite material selection</p> <p>2.4 Identify any requirement for expert technical or professional assistance</p>
3. Select composite materials for specific manufacturing and engineering related applications	<p>3.1 Determine the least constrained composite materials for the requirement</p> <p>3.2 Select potential composite material based on the requirement and consideration of principal properties and further processing</p> <p>3.3 Arrange appropriate tests to confirm suitability of selected composite materials</p> <p>3.4 Review test results and use the information in the selection process</p> <p>3.5 Confirm selection according to standard operating procedures</p> <p>3.6 Produce composite materials selection report including traceability records for material selection process, recommendations, and supporting data</p>

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are explicit in the performance criteria of this unit of competency.

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 engineering composite materials include:	<ul style="list-style-type: none"> • polymers and plastics including: <ul style="list-style-type: none"> • linear polymers • thermoplastic polymers • thermoset polymers • natural and synthetic elastomers • crystalline polymers • additives including fillers, reinforcements, plasticizers, UV stabilisers, antioxidants, lubricants, colourings and flame retardants • resins • fibres including: <ul style="list-style-type: none"> • natural fibres and whiskers • metallic and non-metallic • carbon fibres • glass fibres e.g. Al₂O₃, SiC fibres • adhesives.
Resins include one or more of the following:	<ul style="list-style-type: none"> • resin types including: <ul style="list-style-type: none"> • phenolic • polyester • alkyd • polycarbonate • polyurethane • polyamide • silicone • epoxy • polyethylene • polystyrene • polypropylene • vinyl ester.
Appropriate tests include those:	<ul style="list-style-type: none"> • undertaken by employees within the organisation • required to be undertaken by external organisations.
Required properties to be tested include:	<ul style="list-style-type: none"> • tensile strength • compression • shear characteristics • torsion • hardness • impact resistance • fatigue resistance • creep resistance • visual appearance and colour

	<ul style="list-style-type: none">• corrosion resistance.• UV stability• flammability.
Appropriate persons include:	<ul style="list-style-type: none">• internal technicians• 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>