



Australian Government

PMBTECH403 Test fibre-composites materials and laminates

Release: 1

PMBTECH403 Test fibre-composites materials and laminates

Modification History

Release 1. Supersedes and is equivalent to PMBTECH403B Test fibre-composites materials and laminates

Application

This unit of competency covers the skills and knowledge required to test fibre reinforced plastics materials and laminates. It applies to testing of raw materials and products. Tests are typically done to check conformance with design and quality specifications or to compare specific characteristics of materials/products.

This unit of competency applies to technicians or those in similar roles who are required to determine test specifications, prepare samples, perform tests and make recommendations based on the results.

This unit of competency applies to a technician applying specialised theoretical and technical knowledge and well developed skills in situations that require autonomy, discretion and judgement. The person may work alone or as a member of a team or group and will work in liaison with other shift team members, team leader and supervisor, as appropriate.

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

Pre-requisite Unit

Nil

Competency Field

Technical

Unit Sector

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Determine test requirements

1.1 Identify properties to be measured according to specification

1.2 Select appropriate test methods according to specifications

		1.3	Select appropriate testing equipment according to standards and specifications
2	Perform raw material tests	2.1	Prepare samples according to specification
		2.2	Perform tests in accordance with job specifications
		2.3	Record test results according to standard procedures
		2.4	Interpret test results and compare with manufacturer material data sheets
3	Perform moulded product tests	3.1	Prepare samples according to specification
		3.2	Perform tests in accordance with job specifications
		3.3	Record test results according to standard procedures
		3.4	Interpret test result and compare against quality specification
4	Record and report test results	4.1	Document tests to enterprise requirements
		4.2	Compare results against standards
		4.3	Make written recommendations based on test results

Foundation Skills

This section describes those required skills (language, literacy and numeracy) 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.

Regulatory framework The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, manual handling and hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

Procedures All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- test procedures
- technical specifications
- technical drawings
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Tools and equipment Tools and equipment include:

- testing equipment, including one or more of:
 - gel timer
 - flow meter
 - tensile tester

- hardness tester
- mold flow indexer
- flammability/smoke tester
- flexular tester.

Additional tools and equipment will be selected as required from:

- equipment specified by AS/NZ standards (where applicable)
- materials handling equipment
- relevant personal protective equipment (PPE).

Hazards Hazards must be identified and controlled. Identifying hazards requires consideration of:

- hazardous products and materials
- vapours or other atmospheric hazards
- interaction of polymers, additives and other materials
- other hazards that might arise.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMBTECH403B Test fibre-composites materials and laminates

Links

Companion Volume implementation guides are found in VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090>

Assessment Requirements for PMBTECH403 Test fibre-composites materials and laminates

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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:

- read and interpret technical reports and specifications, material data sheets and standard test methods
- determine test specifications
- prepare samples
- perform tests
- record test results
- interpret results and make recommendations, including one (1) or more of:
 - process control actions
 - raw material suitability
 - product acceptance.

Knowledge Evidence

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

- types of tests, their purposes and functions, including:
 - raw material applications (e.g. resin viscosity, specific gravity of resins and gelcoats, gel time, resin exotherm, monomer content, heat deflection temperature, styrene emission, resin colour, and gelcoat water resistance)
 - laminate applications (e.g. Barcol hardness, tensile strength and elongation, compressive strength, flexural strength and flexural modulus, impact strength, glass content, water absorption, product weathering capabilities, dielectric strength, flammability, acid and alkali resistance, and thickness testing)
 - test applications (e.g. comparing use of common resins and reinforcements in laminates, comparing the tensile strength of given laminates with metals, and comparing test failure modes of laminate samples with metals)
- materials, equipment and process interactions and their impacts on performance
- quality requirements at each stage of production
- product or material test performance indices within standard variation and standard response procedures
- role of testing in quality control and quality assurance procedures

- relevance of failure mode to fibre reinforced plastic laminate design
- effect of creep and fatigue on laminates
- relationship of laminate thickness to bonding and material properties
- span and deflection
- safe test procedures
- organisation procedures relevant to the work environment/job role
- 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.
- 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.

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