



Australian Government

PMBTECH404B Mould chemical resistant and/or fire retardant fibre-composites

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers moulding of fibre-composites for chemical resistant and/or fire retardant applications and the solving of complex, non-routine problems.

Application of the Unit

Application of this unit

This competency is typically performed by technicians applying knowledge of materials, product purpose and processes to laminate and lay-up special-purpose chemical-resistant/fire retardant composite products. It also requires using a broad knowledge base incorporating some theoretical concepts to recognise and resolve a range of problems.

The technician will:

- select materials and processes to meet product requirements
- check product for quality and conformity to specifications
- make adjustments to remedy faults and nonconformity, as required
- solve equipment, material and process problems, seeking assistance where necessary or appropriate.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of:

- *PMBPROD347A Produce composites using hand lamination* **OR**
- *PMBPROD380A Produce composites using chopper gun/depositors.*

NOTE that *PMAPER200A Work in accordance* with an issued permit may also be needed in some circumstances.

Employability Skills Information

Employability Skills

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

ELEMENT	PERFORMANCE CRITERIA
Elements describe the essential outcomes of a unit of competency	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT ELEMENT	PERFORMANCE CRITERIA Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
1. Confirm product specifications.	1.1 Confirm the conditions of use of the desired composite product. 1.2 Confirm the required specification of the desired composite product. 1.3 Determine any other special requirements of the desired composite product. 1.4 Obtain client signoff of specification/ requirements.
2. Select appropriate materials/process to produce the desired composite product.	2.1 Identify the laminate properties suitable for the job. 2.2 Select the appropriate resin, matrix and other materials. 2.3 Select the process to be used to make product. 2.4 Implement measures to control identified hazards in line with procedures and duty of care. 2.5 Make trial samples where required and test or arrange testing of samples as required. 2.6 Check suitability of combination of materials and process to meet all end use requirements, 2.7 Complete pre-start checks.
3. Lay up or mould the laminate.	3.1 Prepare and apply mould release to the mould surface if required. 3.2 Clean and prepare structure surface for adhesion if required. 3.3 Apply laminate materials to the mould or to the structure as required. 3.4 Inspect/test the laminate surface as required. 3.5 Make adjustments to remedy faults and nonconformity as required. 3.6 Adjust process to minimise scrap and waste. 3.7 Clean, adjust and lubricate equipment as required.
4. Anticipate and solve problems.	4.1 Recognise a problem or a potential problem. 4.2 Determine problems needing priority action. 4.3 Determine possible fault causes.

ELEMENT	PERFORMANCE CRITERIA
ELEMENT	Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.
	4.4 Solve problems within area of responsibility. 4.5 Refer problems outside area of responsibility to designated person, with possible causes. 4.6 Follow through items initiated until final resolution has occurred.

Required Skills and Knowledge

This describes the essential skills and knowledge and their level required for this unit.

Application of knowledge of materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production.

Knowledge and ability to implement organization procedures, quality requirements at each production stage and relevant regulatory requirements, within appropriate time constraints and work standards.

Application of the knowledge of managing risks using the hierarchy of controls applied to the lamination or lay-up processes. Application of approved hazard control and safety procedures and the use of PPE in relation to handling materials, equipment, operation and cleanup.

Knowledge as a basis for solving process and material problems:

- characteristics of materials and behaviour in relation to heat, pressure, flow rate and time
- construction of chemical resistant laminates, techniques and equipment used
- techniques and equipment used for fire retardant laminates
- techniques and equipment used for wet-area applications
- applications (eg marine, aerospace, commercial)
- changes to materials at various stages of production
- impact of variations in raw materials and equipment operation in relation to final product
- waste management and importance of non-conforming materials.

Skills to identify and take appropriate action on the range of possible causes of product faults.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- maintain output and product quality using appropriate instruments, controls, test information and readings
- identify and describe own role and role of others involved directly in the process
- identify when assistance is required to solve problems.

Language, literacy and numeracy requirements

This unit requires the ability to read and interpret typical product specifications, job sheets, procedures, material labels and safety information as provided to technicians.

Writing is required to the level of completing workplace forms.

Numeracy is required, eg to determine quantities required and to interpret corrosion resistance and fire retardance data/tables.

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.

Overview of assessment

A holistic approach should be taken to the assessment.

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria and skills and knowledge.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the knowledge and skills defined in this unit. These may include the ability to:

- select and apply the appropriate laminate to meet the cost and performance specification for the particular job
- identify critical materials properties and process variables in relation to the process requirements and the end product
- make adjustments to the process as required
- identify and take appropriate action on problems and potential problems.

Consistent performance should be demonstrated. For example, look to see that:

- the process runs consistently and smoothly, with minimum need for intervention
- all safety procedures are always followed.

Assessment method and context

Assessment will occur on special purpose chemical resistant/fire retardant lamination method and equipment and will be undertaken in a work-like environment

Competence in this unit may be assessed:

- over a range of actual special purpose lamination methods which are undertaken in the workplace
- in a situation allowing the for generation of evidence of the ability to recognise, anticipate and solve problems
- using a suitable simulation and/or a range of case studies/scenarios
- through a combination of these techniques.

In all cases it is expected that practical assessment will be combined with targeted questioning to assess the underpinning knowledge and theoretical assessment will be combined with appropriate practical/simulation or similar assessment. Assessors need to be aware of any cultural issues that may affect responses to questions.

Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Specific resources for assessment

This section should be read in conjunction with the Range Statement for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method.

Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.

Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Add any essential operating conditions that may be present with training and assessment depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts. Where reference is made to industry codes of practice and/or Australian/international standards, the latest version must be used.

Context

This unit covers the making of a resistant/retardant laminate in a factory environment on a mould, or the laying up of a composite surface on a substrate such as a tank surface.

This unit covers both the selection of the appropriate resin, matrix and process from the standard systems available from the technician's enterprise, and the making of the resistant/retardant product. It does not extend to the developing of totally new products using new resin/matrix systems for new (to the enterprise) end use environments. PMB TECH 505 or TECH 601 are more appropriate units in these circumstances.

Procedures

All operations are performed in accordance with procedures.

Procedures include all relevant workplace procedures, work instructions, temporary instructions and relevant industry and government codes and standards. These may include:

- waterproofing
- alkali and acid resistance
- heat resistance
- fire retardancy
- smoke generation
- abrasion resistance
- AS/NZ standards as applicable
- cold weather performance and curing.

Tools and equipment

This competency includes use of equipment and tools such as:

- moulds
- hand mixing tools such as stirrers
- knives and cutters to trim fibres
- hand application tools such as rollers, trowels, brushes etc.
- relevant personal protective equipment.

Hazards

Typical hazards include:

- temperature
- hazardous materials
- manual handling hazards
- equipment operations
- working at heights
- working in confined spaces.

Problems

'Anticipate and solve problems' means resolve a range of complex, non-routine problems using process and product knowledge to develop solutions to problems which do not have a known solution/s recorded in the procedures.

Typical process and product problems may include:

- cracks, dents or imperfections of the mould/substrate
- variations in materials, colour, consistency or mix
- adjustment and settings of the applicator (where used)
- application of the materials to the mould/substrate as required
- contamination of materials
- equipment malfunctions
- pin holes or other imperfections leading to barrier problems.

Appropriate action for problems outside of area of responsibility may be reporting to an appropriate person.

Appropriate action for solving problems within area of responsibility includes asking questions and seeking assistance from appropriate persons/sources.

Variables

Key variables to be monitored include:

- surface finish
- colour
- thickness
- product integrity and general conformance to specifications.
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Unit Sector(s)

Not applicable.