



Australian Government

Department of Education, Employment and Workplace Relations

PMBPROD398B Produce composites using pre-pregs

Revision Number: 1

PMBPROD398B Produce composites using pre-pregs

Modification History

Not applicable.

Unit Descriptor

Unit descriptor

This competency covers the operation of equipment using pre-pregs to make composite products and the solving of non-routine problems. This competency is typically performed by advanced operators demonstrating some relevant theoretical knowledge and using a range of well developed skills requiring some discretion and judgement.

Application of the Unit

Application of this unit

This competency applies to advanced operators who are required to apply knowledge of materials, product purpose and processes to the operation of equipment for the production of composites using pre-pregs. The key factors are the production of material meeting quality standards and product requirements and the recognition and resolving of a range of routine and non-routine problems.

It includes:

- identifying and planning own work requirements from production requests
- identifying and minimising any hazards connected with materials and process from materials safety data sheets, labels and workplace procedures
- checking settings and adjustments of equipment
- checking materials for conformity to job requirements
- monitoring equipment operation and correcting process variations
- correcting materials, equipment or process variations and making appropriate adjustments
- discarding non-conforming products ensuring discarded materials are reused where possible and waste and scrap is disposed of in accordance with workplace instructions
- solving routine and non-routine composites production equipment and process problems, seeking guidance where necessary or appropriate
- completing logs and reports.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisites

This unit has the prerequisite of *PMBPROD298A Operate equipment using pre-pregs material*.

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. Plan own work requirements.	1.1 Identify equipment and processes used for production process and upstream and downstream operations from production plan or request. 1.2 Identify materials required, including additives. 1.3 Recognise hazards and follow appropriate hazard control/minimisation methods. 1.4 Identify and check emergency stops, guards and controls. 1.5 Identify requirements for materials, quality, production and equipment checks. 1.6 Identify materials, waste management and housekeeping needs.
2. Start up pre-preg process.	2.1 Determine equipment requirements. 2.2 Adjust control panel (eg cycle time, heating, cooling) as required for factors such as temperature, material etc. 2.3 Check equipment, raw material and die/tool all match job requirements. 2.4 Check materials, pre-pregs, release agents etc, are correct. 2.5 Discard, or make adjustments to the process for, non-conforming materials. 2.6 Set up date, batch and materials markings to specifications, as required. 2.7 Complete other pre-start checks in accordance with procedures. 2.8 Start up pre-preg process
3. Operate and make adjustments as required to the process.	3.1 Operate composites forming equipment, noting key variables. 3.2 Monitor controls/displays/terminals for production/process data. 3.3 Monitor product/process quality, thickness and integrity to procedures. 3.4 Make adjustments to remedy faults and nonconformity to standard as required.

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.
	3.5 Maintain continuity of process. 3.6 Collect and reprocess/discard scrap/waste and other materials in accordance with procedures. 3.7 Clean, adjust and lubricate equipment as required. 3.8 Pause or stop equipment in an emergency, following procedures.
4. Shut down machine to procedures	4.1 Determine type of shut down 4.2 Select appropriate cleaning method 4.3 Clean efficiently and adequately as required 4.4 Leave machine in appropriate condition and with appropriate locks, tags or notices 4.5 Complete relevant documentation 4.6 Ensure area is clean and clear after the shutdown, in readiness for the next start-up
5. Anticipate and solve problems	5.1 Recognise a problem or a potential problem. 5.2 Determine problems needing priority action. 5.3 Refer problems outside area of responsibility to appropriate person, with possible causes. 5.4 Seek information and assistance as required to solve problems. 5.5 Solve problems within area of responsibility. 5.6 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 the materials, equipment and process sufficient to recognise material and equipment conditions which may lead to out of specification production. Knowledge of organization procedures and relevant regulatory requirements along with the ability to implement them within appropriate time constraints and work standards. Application of the knowledge of managing risks using the hierarchy of controls applied to the pre-preg moulding process. 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 processing and material problems including:

- products, materials and material characteristics
- behaviour of materials in relation to heat, pressure and time
- quality requirements at each production stage
- function and operating principles of composites forming equipment, machine components and ancillary equipment
- impact of temperature, pressure, time during cycles on product quality and production output
- nature of mechanical, hydraulic, pneumatic, electrical and electronic principles which effect machine operation and product development
- safety procedures and the use of PPE in relation to handling materials, equipment operation and cleanup
- the hierarchy of control, including engineering controls
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- waste management and importance of non-conforming materials
- make adjustments to equipment operation to rectify variations in equipment operation or product quality
- check composites forming equipment for correct set-up to job specifications and implement adjustments or report deviations immediately
- make measurements when required and identify product out of specification
- distinguish between causes of faults
- polymer properties and their interactions with process conditions
- relationships between polymer properties and process conditions
- changes to polymer properties to better suit process requirements
- product problems related to polymer properties
- product problems related to process conditions
- adjustments to process conditions to meet polymer and product requirements.

Competence also includes the ability to:

- plan own work, including predicting consequences and identifying improvements
- interpret from production requests the correct selection and use of equipment, materials, processes and procedures
- 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 factors which may affect product quality or production output and appropriate remedies
- identify when the operator is able to rectify faults and when assistance is required.

Language, literacy and numeracy requirements

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

Writing is required to the level of completing workplace forms and production reports.

Numeracy is required to the level of determining required weights/volumes of materials in a resin mix for different circumstances (say using a data sheet), number of layers of impregnated matrix required to yield the required product laminate thickness, and similar activities.

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.

Where the assessee does not currently possess evidence of competency in *PMBPROD298A Operate equipment using pre-pregs* material, it may be co-assessed with this unit.

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:

- identify critical materials properties and composites moulding process characteristics in relation to the process requirements and the end product
- plan own work process within workplace procedures and explain the reasons for the steps in the process
- take appropriate action to observe equipment, materials and products for out of specification results, make adjustments and identify problems to be reported.

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

- production quality and output standards are met consistently
- problems are anticipated from process observations
- problems are efficiently resolved
- the process runs consistently and smoothly.

Assessment method and context

Assessment will occur on an industrial pre-pregs and equipment and will be undertaken in a work-like environment.

Competence in this unit may be assessed:

- using an appropriate, industrial pre-preg and equipment

- in a situation allowing for the generation of evidence of the ability to recognise, anticipate and respond to problems
 - by 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 competency applies to manufacture of composites products using pre-pregs within the plastics and rubber industries.

It includes all moulds, pumps and programmable logic controllers (PLCs) if fitted and all relevant ancillary equipment integral to the composites forming process.

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.

Tools and equipment

This competency includes use of equipment and tools such as:

- moulds, formers, closures and fittings
- equipment including presses and ancillaries
- controller, such as PLC if fitted
- relevant personal protective equipment (PPE)

- hand tools used in the production process
- material loading equipment used for loading of raw materials
- release films and fabrics
- pre-pregs.

Hazards

Typical hazards include:

- hazardous vapours and materials
- fibres, airborne and handled
- humidity, air temperatures, radiant heat, hot moulds
- stationary and moving machinery, parts and components
- manual handling hazards.

Problems

Respond to/rectify 'non-routine problems' means 'apply known solutions to a variety of predictable problems'.

Typical process and product problems may include:

- pre-preg incorrectly applied to mould
- release agents performance
- contamination
- temperature variations, affecting resin cure-rate
- blemishes
- missing detail
- warped moulds or dies
- worn or damaged mould parts or fittings
- variations in materials and/or contamination of materials
- processing
- heat
- poor handling or storage of pre-pregs
- equipment - adjustments/set-up
- equipment - maintenance requirements incorrect quantity of materials
- contaminated materials.

Variables

Key variables to be monitored include:

- operating temperatures
- cycle time
- output rate
- surface finish and condition
- product weight
- product integrity and general conformance to specification/sample.
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Unit Sector(s)

Not applicable.