



Australian Government

Department of Education, Employment and Workplace Relations

MEM26001A Lay up composites using open moulding techniques

Release: 1

MEM26001A Lay up composites using open moulding techniques

Modification History

Release 1 New unit

Unit Descriptor

This unit of competency covers the skills and knowledge required to fabricate composites using hand lay-up and/or chopper gun and/or other open moulding techniques.

Application of the Unit

This unit covers one of the fundamental techniques for fabricating a composite product – open moulding techniques. These are the traditional methods of composite fabrication and provide great flexibility in application. Open moulding may be undertaken by an individual or a fabrication team. It may be undertaken in a workshop or factory environment or in the field and may be used to manufacture new products, prototypes and samples, or to make repairs. This unit is one of three units covering the basic composite fabrication techniques, the other two being MEM26002A Lay up composites using vacuum closed moulding techniques and MEM26003A Lay up composites using pressure closed moulding techniques, which together are intended to ensure the composite tradesperson can undertake a basic fabrication using these methods.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

- | | | | |
|---|----------------------------|-----|--------------------------------------------------------------------------------|
| 1 | Select process | 1.1 | Identify product requirements |
| | | 1.2 | Select open moulding technique most appropriate to product requirements |
| | | 1.3 | Identify or develop required procedures to make product using selected process |
| 2 | Set up equipment/workplace | 2.1 | Select required items of equipment and ancillary equipment |
| | | 2.2 | Prepare equipment and ancillary equipment, as required |
| | | 2.3 | Assemble all equipment ready for use as required by procedure |
| 3 | Prepare materials | 3.1 | Identify required reinforcing/reinforcing system |
| | | 3.2 | Determine quantity of reinforcing required |
| | | 3.3 | Prepare reinforcing as required |
| | | 3.4 | Identify required resin system |
| | | 3.5 | Identify and control hazards |
| | | 3.6 | Determine quantity of resin components required |
| | | 3.7 | Check adequate quantities are available |
| | | 3.8 | Mix resin |
| | | 3.9 | Minimise waste |

- 3.10 Test resin
- 4 Fabricate and adjust equipment and materials, as required
 - 4.1 Apply gel coat, as required
 - 4.2 Apply resin and reinforcing, as required
 - 4.3 Ensure required resin distribution
 - 4.4 Cure product
 - 4.5 Remove product from mould when ready
 - 4.6 Perform final verification of meeting product requirements
- 5 Clean up and maintain equipment
 - 5.1 Clean all moulding and mixing equipment
 - 5.2 Undertake minor maintenance, as required
 - 5.3 Prepare for next use or storage, as required
 - 5.4 Inspect equipment for faults and take appropriate corrective action
 - 5.5 Store equipment, as required
 - 5.6 Minimise waste
 - 5.7 Dispose of waste, as appropriate
 - 5.8 Complete required logs and reports

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- interpreting specifications and instructions
- calculation of material quantities
- working safely and using personal protective equipment
- removing included air
- using rollers, brushes and/or chopper gun
- performing vacuum leak testing
- doing minor maintenance to chopper guns and/or pump systems (reciprocating airless pumps with air support)
- operating and maintaining solvent cleaner (filter)
- undertaking mechanically assisted movement of large parts (e.g. chain hoist)
- assembling, cleaning and preparing simple and complex moulds
- releasing product from simple and complex moulds (using jacks, air and water)
- applying release systems (wax)
- ensuring compliance to specifications

Required knowledge

Required knowledge includes:

- preparation schedules, terminology and information relevant to standard work instructions
- applicable codes and regulations
- safe work practices and correct use of personal protective equipment
- release agents surface tension
- managing lay-up teams
- gel coat application
- reinforcement lay-up
- resin types and applications
- common tools/equipment and their maintenance
- correct laminating techniques and finishing off (e.g. detail consolidation/rolling, check consistency and evenness of resin/glass, remove air entrapment and check with light)
- managing post-cure requirements (e.g. air cure and oven cure)
- production environment variables, such as effect of humidity (e.g. epoxy backbone), temperature, ultraviolet (UV) light and contamination from other processes

- managing hazardous environments (e.g. styrene levels)
- function of catalysts, accelerators and promoters
- control of overspray
- storage of moulds
- housekeeping
- waste disposal

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessment for this unit of competency will occur on the job.</p> <p>It is essential that the process and equipment be understood and that the importance of critical material properties, settings and readings is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.</p> <p>Consistent performance should be demonstrated. In particular look to see that:</p> <ul style="list-style-type: none"> • waste is minimised • product is made efficiently and to standard • tools and equipment are appropriately maintained. <p>Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency.</p>
<p>Context of and specific resources for assessment</p>	<p>Assessment will require the fabrication of suitable objects using open moulding techniques.</p> <p>Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.</p>
<p>Method of assessment</p>	<p>Typically, persons engaged in composites trade work are required to apply their skills and techniques across a range of jobs and specifications.</p> <p>A single assessment event is not appropriate. On the job assessment must be included as part of the assessment process. Assessment judgements must consider evidence of the candidate's performance in a productive work</p>

	<p>environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit.</p> <p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.</p> <p>The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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. Bold italicised wording, if used in the performance criteria, is detailed below. 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) may also be included.

Procedures	<p>Procedures may be written, verbal, computer-based or in some other form, and may include:</p> <ul style="list-style-type: none"> • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant • good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations
Open moulding techniques	<p>Open moulding techniques may include:</p> <ul style="list-style-type: none"> • hand lay-up

	<ul style="list-style-type: none"> • chopper gun • filament winding
Requirements of product	<p>Requirements of product may be determined from various sources, including:</p> <ul style="list-style-type: none"> • drawings • product specifications • customer requests • descriptions of required use of product
Equipment	<p>Equipment includes:</p> <ul style="list-style-type: none"> • moulds and mould components • resin application and dispersion tools
Preparing reinforcing	<p>Preparing reinforcing includes:</p> <ul style="list-style-type: none"> • cutting to size/shape, as required • any pre-treatment required
Logs and reports	<p>Logs and reports may include:</p> <ul style="list-style-type: none"> • paper or electronic based • verbal reports • items found which require action
Appropriate action	<p>Appropriate action includes:</p> <ul style="list-style-type: none"> • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person
Typical problems	<p>Typical problems may include:</p> <ul style="list-style-type: none"> • contamination • air entrapment • resin rich • uneven distribution of resin • difficult mould shapes • resin curing too quickly • resin curing too slowly • failure to release
Health, safety and environment (HSE)	<p>All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed</p>

	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 HSE requirements, the HSE requirements take precedence
--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Unit Sector(s)

Composites

Custom Content Section

Not applicable.