



Australian Government

Department of Education, Employment and Workplace Relations

MEM26009A Select and use cores and fillers appropriate for product

Release: 1

MEM26009A Select and use cores and fillers appropriate for product

Modification History

Release 1 New unit

Unit Descriptor

This unit of competency covers the skills and knowledge required to select and use appropriate cores and fillers for a job from what is normally used by organisation, as well as what is available commercially. It includes purposes of cores and fillers, typical applications of core materials, strengths and weaknesses, and fabrication processes.

Some industry usage includes cores as a subset of reinforcing, but they are separated in this qualification for purposes of clarity.

Application of the Unit

This unit may cover the redesign of an existing product (e.g. using a different process) or the design of a new product similar to an existing product.

This unit does not include the selection of a suitable resin system. Where the resin system also needs to be chosen refer to MEM2626008A Select and use resin systems appropriate for product.

This unit does not cover the selection of suitable reinforcing. Where reinforcing also needs to be chosen refer to MEM26007A Select and use reinforcing appropriate for product.

Core and filler selection and use may typically be undertaken by an individual in liaison with relevant stakeholders or it may undertaken by a team. Selection may be undertaken in an office environment or at the worksite.

Use of the core and filler will be as part of a fabrication and may be undertaken by an individual or a 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.

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	Interpret product requirements	1.1	Determine requirements of final products
		1.2	Determine requirements of core and/or filler
		1.3	Select appropriate process to be used to fabricate product
2	Select most appropriate core and/or fillers for job	2.1	Compile specification of required composite properties relevant to the core and/or filler
		2.2	Compare required properties with specifications of available cores and/or fillers
		2.3	Select most appropriate core and/or filler
3	Evaluate selected core and/or filler	3.1	Fabricate a sample using the selected core and/or filler and nominated resin and reinforcing system
		3.2	Conduct/organise for relevant tests
		3.3	Evaluate process evaluation test (PET) results
		3.4	Review match of PET results with product requirements
		3.5	Review fabrication process
		3.6	Make any required changes to core, filler or process

- | | | | |
|---|-------------------|------|---|
| 4 | Fabricate product | 4.1 | Identify and control hazards |
| | | 4.2 | Prepare selected core and/or filler, as required |
| | | 4.3 | Lay core in correct direction, as appropriate |
| | | 4.4 | Prepare nominated reinforcing, as required |
| | | 4.5 | Lay reinforcing in correct direction, as appropriate |
| | | 4.6 | Mix nominated resin system, as required |
| | | 4.7 | Prepare and incorporate core and/or filler, as required |
| | | 4.8 | Fabricate product using selected process |
| | | 4.9 | Minimise waste |
| | | 4.10 | Review product compared to requirements |
| | | 4.11 | Review core and/or filler selection and fabrication process |
| | | 4.12 | Identify areas for improvement and take appropriate actions |
| | | 4.13 | Complete any required documentation/reporting |

Required Skills and Knowledge

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

Required skills

Required skills include:

- using relevant hand and power tools
- fabricating composite products using appropriate techniques
- interpreting quality control and quality assurance requirements
- interpreting specifications
- interpreting product/technical data sheets and material safety data sheets (MSDS)

Required knowledge

Required knowledge includes:

- types of cores
- chemical makeup of cores, including urethane, polyvinyl chloride (PVC), styrene acrylonitrile (SAN) (e.g. Corefell), polymethacrylimide (PMI) (e.g. Rohacell), wood (e.g. end grain balsa), cellulose (e.g. phenolic coated paper), polypropylene (PP), polyethylene (PE), aluminium honeycomb and aramid honeycomb (e.g. Nomex)
- types of fillers
- machining techniques
- function of cores and fillers
- bonding of cores and fillers
- wettability of cores and fillers by the resin
- properties of cores and fillers and their contributions to the properties of the composite
- interrelationship between cores, fillers and matrix
- modes of core failure

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.

Critical aspects for assessment and evidence required to demonstrate	It is essential that the process and equipment be understood and that the importance of critical material
---	---

competency in this unit	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. Consistent performance should be demonstrated. In particular look to see that: • all reasonably available cores and/or fillers have been considered • an appropriate core/filler has been chosen • the reasons for choosing the core and/or filler are sound • the product meets its required performance. Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency.
Context of and specific resources for assessment	Assessment will require the selection and use of appropriate cores and fillers for specified composite jobs. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.
Method of assessment	A single assessment event is not appropriate. On-the-job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. 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. 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.
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	Procedures may be written, verbal, computer-based or in some other form, and may include: • 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
Cores	Core is used to include: • materials used to provide thickness and so rigidity (and perhaps thermal and acoustic insulation) to a laminate, but not significant structural strength, which is provided by reinforcing
Fillers	Fillers include: • particulate materials which may be added to the composite matrix to vary the bulk, stiffness, density or other properties of the final composite
Requirements of final product	Requirements of final product may be determined from various sources, including: • drawings • product specifications • customer requests • descriptions of required use of product
Requirements of core	Requirements of core include: • stiffness/flexibility • directionality • density

	• shear strength • insulating properties • operating temperature
Most appropriate core/filler	Most appropriate core/filler refers to that core/filler which has: • compliance with product requirements • greatest ease of use in manufacture • best financial return • greatest sustainability contribution
Sustainability	Sustainability incorporates the three aspects of: • survival of the ecology/physical environment – which means that an enterprise needs to manage the impact of the business to ensure the survival of the physical environment • economic viability – efficiency, cost and waste reduction and competitiveness to support survival of the business • social sustainability – an enterprise needs to manage the impact of the business to ensure its continued survival within the community and the survival of the community, including occupational health and safety (OHS)
Preparing core	Preparing core includes: • cutting to size/shape, as required • tapering edges, as required • any pre-treatment required (e.g. dehumidifying and priming)
Preparing reinforcing	Preparing reinforcing includes: • cutting to size/shape, as required, • packaging into kits, as required • any pre-treatment required
Preparing filler	Preparing filler may include: • weighing • mixing with resin to required viscosity • any other required preparation Fillers may include: • fillers, such as syntactic foam
Core direction	Core direction includes considerations such as: • directional properties

Reinforcing direction	Reinforcing direction includes considerations such as: • fibre orientation • fibre pre-forming
Logs and reports	Logs and reports may include: • paper or electronic based • verbal reports • items found which require action
Appropriate action	Appropriate action includes: • 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	Typical problems may include: • cost/benefit of different core/filler systems • air/vapour entrapment • bonding/delaminating • contamination • selecting a core/filler suited to the fabrication process
Health, safety and environment (HSE)	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 HSE requirements, the HSE requirements take precedence

Unit Sector(s)

Composites

Custom Content Section

Not applicable.