



Australian Government

MEA405B Repair/modify aircraft composite material structure/components

Revision Number: 2

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Modification History

Minor formatting and editorial changes made. Prerequisite unit version code updated. Missing knowledge requirements reinstated.

Unit Descriptor

This unit of competency is part of the Aeroskills Structures Maintenance Certificate IV training pathway, and of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathways. It covers the competencies required for the repair or modification of fixed and rotary wing aircraft structural components that are made from composite materials. This unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.

Application of the Unit

This unit requires application of hand skills and the use maintenance publications, applicable materials, tools and methods to repair aircraft composite material structure and components.

Applications include composite material structure and components from fixed and rotary wing aircraft either on-aircraft or in the workshop.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA401C Inspect aircraft structures

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.
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Elements and Performance Criteria

1. Plan repair/modification
 - 1.1.Extent of damage is correctly assessed to assist in determining repair procedure
 - 1.2.Structure is supported and prepared in accordance with the applicable maintenance manual to ensure personnel safety and freedom from damage
 - 1.3.Appropriate modification or repair scheme is identified in accordance with structural repair manual and/or approved data
 - 1.4.Specialist advice is obtained in establishing an approved repair scheme where a standard repair scheme cannot be identified or damage criteria is out of limits
 - 1.5.All materials and equipment required are organised
2. Prepare components for hot bonding
 - 2.1.Components are prepared in accordance with applicable process specification
 - 2.2.Bagging is checked to ensure vacuum seal is correct
 - 2.3.Temperature probes are placed appropriately to provide accurate measurement
 - 2.4.Equipment is checked for serviceability to ensure safety in application
 - 2.5.Heat blanket is laid on component or repair in a manner that ensures even temperature distribution
3. Repair/modify components using hot bond
 - 3.1.Hot bonding equipment is operated in accordance with equipment manufacturer's procedures
 - 3.2.Vacuum and temperature recordings are monitored, including checking of hot and cold spots on trailing and leading temperature probes, to ensure specifications are met
 - 3.3.Curing cycle and recording of operating cycle data are monitored as required by approved procedures to ensure specifications are met
 - 3.4.Blemishes are sealed, potted or filled, where necessary, in accordance with applicable process specification
 - 3.5.Component assemblies, including test pieces, requiring further or special treatment are made ready for the appropriate processes
 - 3.6.Required maintenance documentation is accurately completed and correctly processed
 - 3.7.Completed assemblies are tagged, sealed or packaged, as required
4. Repair/modify components using cold cure
 - 4.1.Lay-up of materials is checked to confirm that components meet required specifications
 - 4.2.Curing cycle is regularly monitored to ensure required

specifications are met

- 4.3. Components are checked for blemishes or delamination in accordance with quality procedures
- 4.4. Component assemblies requiring further or special treatment are made ready for the appropriate processes
- 4.5. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
- 4.6. Completed assemblies are tagged, sealed or packaged, as required

Required Skills and Knowledge

Required skills

Look for evidence that confirms skills in:

- applying relevant OHS procedures, including the use of MSDS and PPE
- using approved maintenance documentation and aircraft publications relating to aircraft structure
- identifying composite component applications in aircraft structures
- identifying various aircraft composite materials/resins and their basic properties by interpretation of markings and visual means
- handling and storing of composite materials to industry standards
- assessing composite component damage using visual and tap test methods
- performing composite component repairs using:
 - external patch repair
 - scarf repair
 - stepped repair
 - wet lay up repair
 - composite fastener hole repair
 - metal to metal and metal to composite bonding
- correctly interpreting and/or producing repair scheme/modification drawings/sketches.
- using appropriate hand tools and machines to disassemble and assemble aircraft composite components, parts, sections and skin, including extraction/installation equipment, drilling/cutting equipment and material fasteners

Required knowledge

Look for evidence that confirms knowledge of:

- how to obtain relevant MSDS
- the use of applicable items of PPE
- OHS procedures
- aircraft construction principles
- defining composite terminology
- describing composite component construction methods including structural assembly fastener identification

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>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to apply hand skills and use maintenance publications, applicable materials, tools and methods to repair aircraft composite material structure and components while applying all relevant safety procedures.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>The underlying skills inherent in this unit should be transferable across the range of different material applications and curing requirements. It is essential that specific aspects of the laying up and curing process for aircraft composite materials are checked to ensure quality and safety standards are achieved in this area. Correct checking and wearing of safety protective clothing is critical, particularly in the hot bonding process.</p> <p>Evidence of knowledge about repair techniques and the use of the standard repair manual in a range of different repair situations will be necessary to supplement evidence of ability to plan and undertake component repair. Ability to apply different materials and curing cycles, including composite to composite and composite to metal components, will be necessary to indicate competency in preparing and curing composite materials.</p> <p>A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements of the Unit of Competency are being achieved under routine supervision using materials from each of Groups 1 to 3 in the Range Statement. This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.</p>
<p>Context of and specific resources for assessment</p>	<p>Competency should be assessed in the workplace or simulated workplace. It is also expected that general purpose tools and test equipment found in most routine situations would be used where appropriate.</p>
<p>Method of assessment</p>	
<p>Guidance information for</p>	

assessment	
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Range Statement

<p>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.</p>	
Note	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide
Applicable materials and methods	<p>Applicable materials/methods include:</p> <ol style="list-style-type: none"> 1. Pre-preg materials hot cure (performed on one of carbon graphite, kevlar, fibreglass or aluminium) 2. Cold cure or wet lay-up (using either fibreglass or carbon graphite) 3. Core materials (using one of aluminium, nomex or foam)
Application	<p>Application of this unit may relate to:</p> <ul style="list-style-type: none"> • scheduled or unscheduled maintenance activities • individual or team-related activities
Procedures and requirements	Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Sector(s)

Aviation maintenance

Competency field

Co-requisite units

Not applicable