



Australian Government

MEA405 Repair/modify aircraft composite material structure/components

Release: 1

MEA405 Repair/modify aircraft composite material structure/components

Modification History

Release 1 - New unit of competency

Application

This unit of competency requires application of hand skills and the use maintenance publications, applicable materials, tools and methods to repair aircraft composite material structure and components during the performance of scheduled or unscheduled maintenance. Maintenance may be performed individually or as part of a team.

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

The unit is part of the Aeroskills Structures Maintenance Certificate IV training pathway, and of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathways.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA).

Pre-requisite Unit

MEA401 Inspect aircraft structures

Competency Field

Aviation maintenance

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
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 are 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 while observing all relevant work health and safety (WHS) requirements, including the use of material safety data sheets (MSDS) and items of personal protective equipment (PPE)
 - 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 while observing all relevant WHS requirements, including the use of MSDS and items of PPE
	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

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Applicable materials and methods include:

- Pre-preg materials hot cure (performed on one of carbon graphite, kevlar, fibreglass or aluminium)
- Cold cure or wet lay-up (using either fibreglass or carbon graphite)
- Core materials (using one of aluminium, nomex or foam)

Procedures and requirements include:

- Industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Mapping Information

Release 1 – equivalent to MEA405B Repair/modify aircraft composite material structure/components

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEA405 Repair/modify aircraft composite material structure/components

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Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- applying relevant WHS procedures, including the use of PPE and MSDS
- 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.

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.

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.

Knowledge Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

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

Assessment Conditions

- 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.
- The following conditions of assessment represent the requirements of the Regulators (ADF and CASA) and maintenance stakeholders and must be rigorously observed.
- A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements and performance criteria of the unit of competency are being achieved under routine supervision using materials from each of:
 - pre-preg materials hot cure (performed on one of carbon graphite, kevlar, fibreglass or aluminium)
 - cold cure or wet lay-up (using either fibreglass or carbon graphite)
 - core materials (using one of aluminium, nomex or foam).
- This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide (for details refer to the Companion Volume Assessment Guidelines).
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).
- Where the unit is to be used for CASA licensing purposes the Assessor must also meet the criteria specified in the CASR Part 147 Manual of Standards.

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