



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEA351A Maintain airframe systems of basic light fixed wing aircraft**

**Revision Number: 2**

## **MEA351A Maintain airframe systems of basic light fixed wing aircraft**

### **Modification History**

Minor formatting and editorial changes made. Prerequisite unit version code updated.

### **Unit Descriptor**

This unit of competency is part of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathway. It covers the competencies required to maintain basic light fixed wing aircraft airframe systems and components.

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the applicable Aircraft Maintenance Engineer Licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.

### **Application of the Unit**

This unit requires application of hand skills and the use of system/component knowledge and applicable maintenance publications and test equipment to inspect, test and troubleshoot, and replace components of airframe systems of basic light aircraft.

Applications include fixed wing aircraft that have fixed undercarriage and a normally aspirated engine driving a fixed pitch propeller or a small gas turbine engine.

### **Licensing/Regulatory Information**

Not applicable.

## Pre-Requisites

ME A101B	Interpret occupational health and safety practices in aviation maintenance
ME A103B	Plan and organise aviation maintenance work activities
ME A105C	Apply quality standards applicable to aviation maintenance processes
ME A107B	Interpret and use aviation maintenance industry manuals and specifications
ME A108B	Complete aviation maintenance industry documentation
ME A109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

## 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. Inspect basic light fixed wing airframe systems
  - 1.1. Relevant *maintenance documentation* and modification status, including system defect reports, where relevant, are used to identify specific inspection requirements
  - 1.2. Isolation tags are checked and aircraft configured for safe system inspection and operation in accordance with the applicable maintenance manual
  - 1.3. *Airframe system* components are visually or physically checked for external signs of defects in accordance with applicable maintenance manual
  - 1.4. Defects are correctly identified and reported
2. Test/adjust basic light fixed wing airframe systems and components
  - 2.1. Aircraft and system are prepared in accordance with applicable maintenance manual for the application of power/system operation
  - 2.2. Airframe system is functionally tested in accordance with maintenance manual for evidence of serviceability or malfunction
  - 2.3. System adjustment/rigging is performed in accordance with maintenance manual
3. Troubleshoot basic light fixed wing airframe systems
  - 3.1. Available information from maintenance documentation, inspection and test results are used, where necessary, to assist in fault determination
  - 3.2. Maintenance manual fault diagnosis guides and logic processes are used to ensure efficient and accurate *troubleshooting*
  - 3.3. Specialist advice is obtained, where required, to assist with the troubleshooting process
  - 3.4. Airframe system faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required, in accordance with standard enterprise procedures
  - 3.5. Rectification requirements are determined
4. Remove and install basic light fixed wing airframe system components
  - 4.1. System is rendered safe in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure personnel safety
  - 4.2. *Airframe system component* removal is carried out in accordance with the applicable maintenance manual
  - 4.3. Required maintenance documentation is accurately completed and correctly processed
  - 4.4. Removed components are tagged, sealed and packaged in accordance with specified procedures
  - 4.5. Components to be installed are checked to confirm correct part numbers, serviceability and modification

status

- 4.6. Mass balance of control surfaces to be installed is checked in accordance with the applicable maintenance manual, if required
- 4.7. Installation is carried out in accordance with the applicable maintenance manual
- 4.8. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures

## Required Skills and Knowledge

### Required skills

Look for evidence that confirms skills in:

- using hand skills, tools and test equipment in the testing, adjustment and troubleshooting of airframe systems and components, including airframe system component removal and installation
- recognising system and component defects/external damage, correct installation and security for the range of airframe systems listed in the Range Statement
- removing, installing and rigging of flight controls
- checking flight control mass balance
- performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability
- effectively using maintenance documentation and relevant fault diagnosis guides in the troubleshooting process and for component removal and installation
- applying standard procedures
- observing all relevant OHS procedures, including the use of MSDS and PPE

### Required knowledge

Look for evidence that confirms knowledge of:

- OHS precautions relevant to airframe system maintenance, including the use of MSDS and PPE
- standard trade practices relating to tool and test/rigging equipment usage and installation/securing of system components
- flight control system layout and operation
- theory of flight:
  - airflow
  - conditions of flight
  - lift and forces
  - drag
  - wings, tailplane and vertical stabiliser
  - lift augmentation (flaps, slats and slots)
  - aircraft control surfaces and their function (elevator, ailerons, rudder, elevons and trim tabs)
  - flight control balancing and flutter
  - stability and control and flight control rigging
- system layout and operation:
  - cockpit controls
  - cables and cable tensioning
  - pulleys and fairleads
  - bellcranks

- levers
- control surface horns
- screwjacks
- push/pull rods
- mechanical flight control system maintenance procedures and troubleshooting
- fixed undercarriage and shock absorber systems:
  - undercarriage configurations and types (tailwheel, tricycle and bicycle)
  - relative advantages of undercarriage configurations
  - steering systems
  - types of shock absorber (springs, leaf, coil, spring tube, rubber disc, bungee and oleo)
  - wheels and tyres
  - axles and wheel bearings
  - wheel spats
  - fixed undercarriage maintenance procedures and troubleshooting
- small aircraft brake systems:
  - types of brake system (mechanical and hydraulic)
  - master/slave cylinder hydraulic brake system operation
  - hydraulic fluids and seals
  - rigid and flexible plumbing
  - brake pads and shoes
  - brake discs and drums/linings
  - brake system maintenance procedures and troubleshooting
- cabin heater system layout and operation:
  - heat source (muff heaters)
  - ducting for heating and demisting
  - valves and linkages
  - fan
  - cabin heating system maintenance procedures and troubleshooting
- fuel system layout and operation:
  - fuel tank types and location
  - selector valves and linkages
  - drain valves
  - rigid and flexible plumbing
  - fuel filters
  - boost pumps
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures

## 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><b>Overview of assessment</b></p>	<p>A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot airframe systems and remove and install a range of airframe system components that is representative of the scope of the listed variables in accordance with relevant maintenance manual instructions while applying all relevant OHS procedures and standard processes.</p>
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>The underlying skills inherent in this unit should be transferable across a range of inspection, testing and troubleshooting applications (including the timely involvement of supervisors or other trades) associated with airframe systems and components of basic light fixed wing aircraft. It is essential that relevant procedures, cleanliness requirements and safety precautions are fully observed, understood and complied with. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical.</p> <p>Evidence of transferability of skills and knowledge related to inspection, testing, troubleshooting and component removal and installation is essential. This may be demonstrated through application across a range of airframe systems and components as listed in the Range Statement. The application of testing procedures should clearly indicate knowledge of system operation, the relationship of individual components and the links with other systems (if applicable) within the limits of the aircraft/system fault-finding guide before undertaking any action. The work plan should take account of applicable safety and quality requirements in accordance with the industry and regulatory standards.</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 this unit of competency are being achieved under routine supervision on groups listed in the Range Statement, as follows:</p> <ul style="list-style-type: none"> <li>• at least one of each system listed in Groups 1 to 5</li> <li>• a representative range of components from each of Groups 6 to 12.</li> </ul>



	This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.
<b>Context of and specific resources for assessment</b>	Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in maintenance documentation. It is also expected that general purpose tools and test equipment found in most routine situations would be used where appropriate.
<b>Method of assessment</b>	
<b>Guidance information for assessment</b>	

## 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>	
<b>Note</b>	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide
<b>Maintenance documentation</b>	<p>Relevant maintenance documentation includes:</p> <ul style="list-style-type: none"> <li>• servicing schedules</li> <li>• maintenance manuals</li> </ul>
<b>Airframe systems</b>	<p>Airframe systems may include:</p> <ol style="list-style-type: none"> <li>1. Flight control systems</li> <li>2. Fixed undercarriage shock absorbers</li> <li>3. Master/slave cylinder brake systems</li> <li>4. Fuel systems</li> <li>5. Cabin heating systems</li> </ol>
<b>Troubleshooting</b>	Troubleshooting involves the use of test sets, downloaded maintenance data and fault-finding charts or similar, to line replacement level
<b>Airframe system components</b>	<p>Airframe system components may include:</p> <ol style="list-style-type: none"> <li>6. Ailerons, elevators, rudders, trim tabs, flaps and slats</li> <li>7. Flight control wheels or sticks, cables, pulleys, guides, fairleads, bellcranks, rods, torque tubes, chains, sprockets, trim wheels or handles and rudder pedals or bars</li> <li>8. Fixed undercarriage hydraulic and rubber shock absorbers</li> <li>9. Wheels and brake units</li> <li>10. Brake master cylinders and rigid or flexible plumbing</li> <li>11. Rigid or flexible fuel tanks, selector/shutoff valves and rigid or flexible plumbing</li> <li>12. Cabin heater ducting and control valves</li> </ol>
<b>Application</b>	Application of this unit may relate to:

	<ul style="list-style-type: none"><li>• scheduled or unscheduled maintenance</li><li>• individual or team-related activities</li></ul>
<b>Procedures and requirements</b>	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