



Australian Government

MEA321 Test and troubleshoot aircraft fixed wing flight control systems and components

Release: 1

MEA321 Test and troubleshoot aircraft fixed wing flight control systems and components

Modification History

Release 1 - New unit of competency

Application

This unit of competency requires application of hand skills and the use of maintenance publications and knowledge of system theory to test and troubleshoot aircraft flight control systems and components of fixed wing aircraft during the performance of scheduled or unscheduled maintenance. Maintenance may be performed individually or as part of a team.

The unit is part of the Mechanical Aircraft Maintenance Engineer (AME) Certificate IV 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).

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen maintenance certification licence under Civil Aviation Safety Regulation (CASR) Part 66, in accordance with the licensing provisions in the Companion Volume Implementation Guide.

Pre-requisite Unit

MEA318	Inspect aircraft hydro-mechanical, mechanical gaseous and landing gear systems and components
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Competency Field

Aviation maintenance

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.

1. Prepare for troubleshooting

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Relevant maintenance documentation and modification status, including system defect reports, where relevant, are interpreted to identify an unserviceability

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| 2. | Test fixed wing flight control systems | 2.1 | Powered controls of the aircraft and system are prepared in accordance with maintenance manual for the application of electrical and hydraulic power |
| | | 2.2 | Power is applied, if necessary, and system is functionally tested in accordance with applicable maintenance manual for malfunction or evidence of incorrect rigging while observing all relevant work health and safety (WHS) requirements |
| | | 2.3 | System rigging is performed in accordance with applicable maintenance manual |
| 3. | Troubleshoot fixed wing flight control systems | 3.1 | Available information from maintenance documentation and inspection and test results is used, where necessary, to assist in fault determination |
| | | 3.2 | Maintenance manual fault diagnosis guide and logical processes are used to ensure efficient and accurate troubleshooting to line replacement level |
| | | 3.3 | Specialist advice is obtained, where required, to assist with the troubleshooting process |
| | | 3.4 | Fixed wing flight control system faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where 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.

Fixed wing flight control systems and components include:

- Ailerons, elevators, rudders, trim tabs, speed brakes, spoilers, flaps and slats
- Actuators – mechanical, hydraulic, pneumatic or electric
- Mechanical flight control components, including cables, pulleys, guides, fairleads, tension regulators, control

rods, bellcranks, torque tubes, chains, sprockets, control sticks (or wheels or columns), trim wheels or handles, and rudder pedals

Procedures and requirements include:

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

Unit Mapping Information

Release 1 – equivalent to MEA321C Test and troubleshoot aircraft fixed wing flight control systems and 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 MEA321 Test and troubleshoot aircraft fixed wing flight control systems and components

Modification History

Release 1 - New unit of competency

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 all relevant WHS procedures
- using relevant maintenance documentation and aircraft manuals to:
 - recognise defects during visual inspection of fixed wing flight control systems and system components
 - rig fixed wing flight control systems
 - functionally test the operation of fixed wing flight control systems and recognise system/component malfunction or evidence of incorrect rigging
 - to the extent permitted by applicable fault diagnosis guides, troubleshooting unserviceabilities in fixed wing flight control systems and clearly record the causes of the unserviceabilities.

The underlying skills inherent in this unit should be transferable across a range of testing and troubleshooting applications (including the timely involvement of supervisors or other trades) associated with the aircraft fixed wing flight systems. It is essential that testing procedures take into account all safety precautions associated with flight control system operation, in particular where system operation/switching interrelates with other systems being maintained, and that knowledge be demonstrated of dual inspection requirements associated with work on flight controls and systems.

This shall be demonstrated through application across the system/component groups listed in the Assessment Conditions.

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:

- WHS precautions relevant to flight control system maintenance
- 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)
- spoilers and speed brakes
- flight control balancing and flutter
- stability and control and flight control rigging
- mechanical system layout and operation:
 - cockpit controls
 - cables and cable tensioning
 - pulleys and fairleads
 - bellcranks
 - levers
 - control surface horns
 - screwjacks
 - push/pull rods
- powered flight controls:
 - system layout and operation
 - component construction and operation
 - electrical and instrument interfaces:
 - flaps
 - trim
 - position indication
- flight control system maintenance procedures and troubleshooting methods
- flight control system rigging equipment and procedures
- flight control system interfaces with automatic pilot systems and automatic flight control systems
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures.

Assessment Conditions

- Competency should be assessed in the work environment or simulated work environment using tools and equipment specified in aircraft maintenance manuals. It is also expected that applicable general-purpose tools, test and ground support equipment found in most routine situations would be used where appropriate. The level of troubleshooting is limited in its application to the use of fault diagnosis guides or other similar information.

- The application of ground 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.
- 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 on at least one (1) item from each of the following groups:
 - ailerons, elevators, rudders, trim tabs, speed brakes, spoilers, flaps and slats
 - actuators – mechanical, hydraulic, pneumatic or electric
 - mechanical flight control components including cables, pulleys, guides, fairleads, tension regulators, control rods, bellcranks, torque tubes, chains, sprockets, control sticks (or wheels or columns), trim wheels or handles, and rudder pedals.
- 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.
- Individuals being assessed who have already attained MEA312 Inspect, test and troubleshoot aircraft fixed wing flight control systems and components, will have met the requirements for the Performance Criteria for Element 1. The requirements for Elements 2 and 3 will also be met if recorded experience for MEA312 Inspect, test and troubleshoot aircraft fixed wing flight control systems and components involved aircraft with powered flight controls. If experience was gained on aircraft types with only mechanical flight controls the recorded experience will partially meet the requirements for this unit. The Log of Industrial Experience and Achievement records relating to MEA312 Inspect, test and troubleshoot aircraft fixed wing flight control systems and components may be accepted as also meeting the evidence requirements for this unit in the applicable areas.

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