



**Australian Government**

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

# **MEA316C Inspect, test and troubleshoot rotary wing rotor and control systems and components**

Release: 2

## **MEA316C Inspect, test and troubleshoot rotary wing rotor and control systems and components**

### **Modification History**

Minor formatting and editorial changes made. Additional assessment advice provided in the Evidence Guide.

### **Unit Descriptor**

This unit of competency is part of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathway. It covers the competencies required to inspect, test and troubleshoot the rotor and control systems and components of rotary wing aircraft. This unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.

Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen 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, the use of maintenance publications and knowledge of rotors and rotor control system theory to inspect, test and troubleshoot rotors and rotor control systems.

Applications include rotary wing aircraft.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

MEA308C            Remove and install rotary wing rotor and flight control system components

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

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| <p>Elements describe the essential outcomes of a unit of competency.</p> | <p>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.</p> |
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## Elements and Performance Criteria

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| <p>1. Inspect rotor and rotor control systems and components</p> | <p>1.1. Isolation and warning signs are fitted/installed to the system or related system configured for safe system inspection and operation in accordance with relevant publications/maintenance regulations orders and standards and practices</p> <p>1.2. <b>Rotor and rotor control system</b> is visually or physically checked/inspected for defects in accordance with relevant aircraft publications maintenance regulations standards and practices</p> <p>1.3. Defects are identified and recorded in accordance with standard enterprise procedures</p>   |
| <p>2. Ground test rotor and rotor control systems</p>            | <p>2.1. Aircraft and system prepared in accordance with relevant aircraft publications regulations orders and standards and practices for the operation of engine and rotor control system</p> <p>2.2. Rotor and rotor control system are functionally tested in accordance with relevant aircraft publications maintenance regulations/orders and standards and practices for engine and rotor malfunction</p> <p>2.3. System calibration or adjustments are performed in accordance with relevant aircraft publications/ maintenance regulations/orders and standards and practices</p>  |
| <p>3. Prepare for troubleshooting</p>                            | <p>3.1. Relevant aircraft publications and modification status, including system de-configuration interpreted to identify an unserviceability</p>  |
| <p>4. Troubleshoot rotor and rotor control systems</p>           | <p>4.1. Available information from aircraft maintenance documentation, inspection reports used to assist in fault determination</p> <p>4.2. Relevant aircraft publication fault diagnosis guide and logical processes are used to provide efficient and accurate <b>troubleshooting</b></p> <p>4.3. Specialist advice is obtained to assist with the troubleshooting process</p> <p>4.4. Rotor and rotor control system faults are located and the causes of the faults identified and recorded in aircraft maintenance documentation in accordance with enterprise procedures</p> <p>4.5. Fault rectification requirements are determined</p> |

## Required Skills and Knowledge

### Required skills

Look for evidence that confirms skills in:

- applying relevant OHS procedures
- using relevant maintenance documentation and aircraft manuals to:
  - recognise through visual/physical inspection external signs of defects in the rotor, rotor head, tail rotor and flight control mechanical system components
  - ground test the rotor and control system and recognise correct function
  - rig and adjust rotor controls and systems
- using fault diagnosis guides and equivalent data, to accurately and efficiently troubleshoot the causes of unserviceabilities in rotor control systems, clearly record details and identify the required rectification actions

### Required knowledge

Look for evidence that confirms knowledge of:

- fault diagnosis techniques
- standard trade practices relating to tool and test/rigging equipment usage
- theory of flight:
  - airflow
  - conditions of flight
  - lift and forces
  - drag
- rotary flight principles:
  - terminology relating to:
    - aerofoils
    - main rotor blades
    - rotor discs
    - rotors - main and tail
  - aerodynamic characteristics:
    - aerofoil design
    - forces
    - rotor thrust and power requirements
    - vortex ring
    - autorotation
  - helicopter stability
- helicopter dynamic components:
  - main rotors:
    - blades
    - heads

- linkages
- tail rotors
- swash plates
- transmissions and drive shafts
- clutches and freewheeling units
- system and component operation, including electrical and instrument system interfaces:
  - cyclic pitch control
  - collective pitch control
  - tail rotor control
  - mechanical and powered control systems
  - engine control interface
  - torque reaction and anti-torque devices
  - engine indication
  - vibration monitoring
- helicopter maintenance procedures and troubleshooting
- relevant maintenance manuals
- relevant regulatory requirements and standard procedures, including requirements for engine and rotor system operation
- relevant OHS practices

## 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.

### Overview of assessment

A person who demonstrates competency in this unit must be able to apply hand skills, use maintenance publications and rotor and rotor control system theory knowledge to inspect, test and troubleshoot rotors and their control systems on rotary wing aircraft while applying all relevant safety precautions.

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

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 the rotor control systems. It is essential that testing procedures take into account all safety precautions associated with ground testing of rotor and rotor control systems, and that awareness be demonstrated of dual inspection requirements associated with work on control systems.

Evidence of transferability of skills and knowledge related to inspection, testing and troubleshooting is essential. This may be demonstrated through application across a number of aircraft types. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical. The application of ground testing procedures should also clearly indicate knowledge of system operation. System operation knowledge, the relationship of individual components and the links with other systems will be necessary to supplement evidence of ability to troubleshoot the system 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.

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 on at least one item from each of Groups 1 to 5, as listed 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.

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| <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 aircraft maintenance manuals. It is also expected that 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. |
| <b>Method of assessment</b>                             | Functional testing of rotors and rotor control systems with engine/s running may be carried out with the applicant directing a pilot qualified on type.   |
| <b>Guidance information for assessment</b>              | Individuals being assessed who have already attained MEA352A Maintain basic rotary wing aircraft systems, will have satisfied the requirements of this unit with regard to common Range Statement variables. Log of Industrial Experience and Achievement records relating to MEA352A Maintain basic rotary wing aircraft systems, may be accepted as also meeting the evidence requirements for this unit in the applicable common areas.  |

## Range Statement

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| <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>Rotor and rotor control system</b>  | Rotor and rotor control system may include: <ol style="list-style-type: none"><li>1. Main rotor blades, tail rotor blades</li><li>2. Rotor heads, swash plates, tail rotor pitch control assemblies</li><li>3. Mechanical, powered flight control components</li><li>4. Main rotor, intermediate or tail rotor gearboxes</li><li>5. Drive shafts and couplings</li></ol> |
| <b>Troubleshooting</b>   | Troubleshooting involves the use of fault-finding charts or similar, to line replacement level   |
| <b>Application</b>   | Application of this unit may relate to: <ul style="list-style-type: none"><li>• scheduled or unscheduled maintenance activities</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