



**Australian Government**

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

# **MEA213C Inspect, test and troubleshoot advanced aircraft instrument systems**

**Revision Number: 2**

## **MEA213C Inspect, test and troubleshoot advanced aircraft instrument systems**

### **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 Avionic Certificate IV (Aviation Maintenance Stream) training pathway. It covers the competencies required to inspect, test and troubleshoot instrument systems and components fitted to the more advanced types of fixed and rotary wing aircraft. The 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 and the use of system/component knowledge and applicable maintenance publications and test equipment to inspect, test and troubleshoot aircraft advanced instrument systems and components.

Applications include fixed and rotary wing aircraft that have advanced instrument systems.

### **Licensing/Regulatory Information**

Not applicable.

## Pre-Requisites

MEA205C	Remove and install advanced aircraft instrument system components
MEA246C	Fabricate and/or repair aircraft electrical components or parts

## 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 aircraft advanced instrument systems and components
  - 1.1. Relevant maintenance documentation and modification status, including system reports, where relevant, are used to identify specific inspection requirements
  - 1.2. Isolation tags are checked and aircraft configured for safe system inspection in accordance with the applicable maintenance manual
  - 1.3. **Instrument system components** are visually or physically checked for external defects in accordance with applicable maintenance manual
  - 1.4. Defects are correctly identified and reported
2. Test/adjust aircraft advanced instrument systems and components
  - 2.1. Aircraft and system are prepared in accordance with applicable maintenance manual application of power/system operation
  - 2.2. Instrument system is functionally tested, in accordance with maintenance manual evidence of serviceability or malfunction
  - 2.3. System calibration or adjustments are performed in accordance with maintenance manual appropriate
3. Troubleshoot aircraft advanced instrument systems
  - 3.1. Available information from maintenance documentation, inspection and test results where necessary, to assist in fault determination
  - 3.2. Maintenance manual fault diagnosis guides and logic processes are used to identify and accurate **troubleshooting**
  - 3.3. Specialist advice is obtained, where required, to assist with the troubleshooting
  - 3.4. Instrument system faults are located and the causes of the faults are clearly and correctly recorded in maintenance documentation, where required, in accordance with standard enterprise procedures
  - 3.5. Rectification requirements are determined

## Required Skills and Knowledge

### Required skills

Look for evidence that confirms skills in:

- recognition of system and component defects/external damage, correct installation, connection of plugs, terminations, attaching hardware (including cabling/harnesses) and security in:
  - flight instruments
  - pitot/static systems
  - navigation systems - compasses and AHRS
  - GPWS
  - position indicators, engine/auxiliary system indication systems and system components
- applying logic processes, taking and interpreting system measurements, use test equipment and appropriate wiring diagrams and manuals to isolate instrument and display system malfunctions in the listed systems
- performing system functional tests and checks to isolate system faults and assess post-maintenance serviceability
- applying relevant OHS practices
- using approved maintenance documentation and aircraft publications relating to the instrument and display systems being maintained

### Required knowledge

Look for evidence that confirms knowledge of:

- component attachment methods
- connection of hardware
- instrument system maintenance requirements and testing and troubleshooting procedures
- the basic layout (block diagram level), function and operation of:
  - flight instruments including:
    - ASIs
    - VSIs
    - air data systems and components
    - machmeters
    - altimeters, including servo and encoding altimeters
    - turn and slip indicators
    - AHs
    - DGs
    - angle of attack and stall warning/avoidance systems
  - pitot/static systems
  - navigation systems:
    - direct reading compasses
    - gyro compasses

- AHRS
- GPWS
- turbine engine instruments, including:
  - temperature and pressure (including thermocouples, sensors and transmitters)
  - speed including mechanical and electric tachometers
  - thrust including fan, propeller and jet
  - torque
  - fuel flow
  - vibration
- auxiliary transmitter/indicator measuring systems, including:
  - hydraulic pressure and temperature
  - pneumatic pressure
  - transmission oil pressure and temperature
  - fuel remaining/used
  - fuel quantity indication
  - component position (e.g. doors, flaps, speed brakes, landing gear)
- FDR systems
- explaining the operating principles of the above-listed systems and associated with:
  - atmospheric conditions; properties and effects on aircraft instruments and systems
  - pressure and temperature sensing elements and their use in aircraft instruments
  - gyroscopes and their use in aircraft instrument and reference systems
- explaining the various methods of navigation, and describing how they are used by both aircraft conventional and electronic navigational instruments and systems
- relevant OHS practices
- 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.

### Overview of assessment

A person who demonstrates competency in this unit must be able to inspect, test and troubleshoot advanced instrument systems and components while observing 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 aircraft advanced instrument systems and components. It is essential that system testing procedures, cleanliness requirements and safety precautions applicable to the system being maintained are fully observed, understood and complied with. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical.

Evidence of transferability of skills and knowledge related to inspection, testing and troubleshooting is essential. This is to be demonstrated through application across a range of advanced aircraft instrument systems and components 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.

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 a system and at least one major system component/(LRU from each of Groups 1 to 7 (Groups 6 and 7 may be omitted where they are not applicable to the enterprise) 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.

<b>Context of and specific resources for assessment</b>	Competency should be assessed in the workplace or simulated workplace using tools and equipment specified in the maintenance manuals. It is also expected that general and special purpose tools, test and ground support equipment would be used where appropriate.
<b>Method of assessment</b>	
<b>Guidance information for assessment</b>	<p>Individuals being assessed who have already attained MEA212C Inspect, test and troubleshoot basic aircraft instrument systems and components, will have covered inspection, testing and troubleshooting of a range of flight instruments and direct reading compass and measuring systems. Log of Industrial Experience and Achievement records relating to MEA212C Inspect, test and troubleshoot basic aircraft instrument systems and components, may be accepted as also meeting the evidence requirements for this unit in the applicable areas.</p> <p>Advice provided in MEA212C Inspect, test and troubleshoot basic aircraft instrument systems and components, regarding MEA275A Maintain basic light aircraft instrument systems and components, should also be considered where applicable.</p>



## 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>	
<p><b>Note</b></p>	<p>Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide</p>
<p><b>Instrument systems and components</b></p>	<p>Instrument system and components include:</p> <ol style="list-style-type: none"> <li>1. Pitot/static system components, ASIs, VSIs, air data systems and components, machmeters, altimeters, including servo and encoding altimeters, angle of attack and stall warning/avoidance systems</li> <li>2. Turn and slip indicators, DGs, AHs, AHRS and components, remote reading gyro compass systems and components and direct reading compasses</li> <li>3. Turbine engine indication systems and components (tachometers, pressure, temperature, engine performance, engine vibration)</li> <li>4. Transmitter/indicator measuring instrument systems (pressure, temperature and position)</li> <li>5. Fuel quantity indication and flow systems and components</li> <li>6. GPWS</li> <li>7. FDRs</li> </ol>
<p><b>Troubleshooting</b></p>	<p>Troubleshooting involves the use of fault-finding charts or similar, to line replacement level</p>
<p><b>Application</b></p>	<p>Application of this unit may relate to:</p> <ul style="list-style-type: none"> <li>• scheduled or unscheduled maintenance activities</li> <li>• individual or team-related activities</li> </ul>
<p><b>Procedures and requirements</b></p>	<p>Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise</p>

## Unit Sector(s)

Aviation maintenance

## **Competency field**

## **Co-requisite units**

Not applicable