



**Australian Government**

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

# **MEA362A Maintain aircraft vapour cycle air conditioning systems**

**Revision Number: 2**

## **MEA362A Maintain aircraft vapour cycle air conditioning systems**

### **Modification History**

Minor formatting and editorial changes made.

### **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 aircraft vapour cycle air conditioning systems.

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 vapour cycle air conditioning systems to inspect, test and troubleshoot systems, and to remove and install mechanical and electrical system components. Compliance with applicable regulations is required where refrigerant evacuation and recharging is performed.

Applications include all aircraft vapour cycle air conditioning systems and components.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

MEA201B	Remove and install miscellaneous aircraft electrical hardware/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 vapour cycle air conditioning systems
  - 1.1. Isolation tags already attached to the system or related systems are checked and aircraft/engine configured for safe system inspection and operation in accordance with applicable maintenance manual
  - 1.2. **Vapour cycle air conditioning systems** are visually or physically checked for external and internal signs of defects in accordance with applicable maintenance manual
2. Test vapour cycle air conditioning systems
  - 2.1. Aircraft and system are correctly prepared in accordance with applicable maintenance manual
  - 2.2. Vapour cycle air conditioning system is tested in accordance with prescribed test procedures to establish serviceability and correct function in accordance with applicable maintenance manual
3. Troubleshoot vapour cycle air conditioning 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**
  - 3.3. Specialist advice is obtained, where required, to assist with the troubleshooting process
  - 3.4. Vapour cycle air conditioning system faults are located and the causes of the faults are clearly identified and correctly recorded in maintenance documentation, where required
  - 3.5. Fault rectification requirements are determined to assist in planning the repair
4. Remove vapour cycle air conditioning system components
  - 4.1. Aircraft and vapour cycle air conditioning system is rendered safe in accordance with the applicable maintenance manual and isolation tags are fitted, where necessary, to ensure the safety of personnel and freedom from damage during component removal
  - 4.2. Where refrigerant evacuation is necessary, evacuation is performed in accordance with regulatory requirements and maintenance manual procedures
  - 4.3. Component removal is carried out in accordance with the applicable maintenance manual
  - 4.4. Component is tagged and prepared for transport or storage in accordance with the specified procedures
  - 4.5. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures
5. Install vapour cycle air conditioning
  - 5.1. Component to be installed is checked to confirm correct part or model numbers, modification status and serviceability

system components

- 5.2. Installation is carried out in accordance with the applicable maintenance manual
- 5.3. Vapour cycle air conditioning system is recharged with refrigerant, where necessary, in accordance with maintenance manual procedures and regulatory requirements
- 5.4. Vapour cycle air conditioning system is tested for correct function and freedom from refrigerant leaks if system recharging has been performed
- 5.5. 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:

- applying relevant OHS procedures, including the selection and use of applicable MSDS and PPE
- complying with regulatory requirements regarding the de-gassing of vapour cycle air conditioning systems
- using relevant maintenance documentation and aircraft manuals
- recognising external and internal signs of defects in vapour cycle air conditioning systems and system components through visual/physical inspection
- testing of vapour cycle air conditioning system operation, be able to operate systems and leak testing equipment, monitor indications and recognise correct function
- using specialist equipment to evacuate and recharge refrigerant
- using fault diagnosis guides and equivalent data to accurately and efficiently troubleshoot the causes of unserviceabilities in vapour cycle air conditioning systems, clearly recording details and identifying the required rectification actions
- correctly removing and installing vapour cycle air conditioning system electrical and mechanical components

### Required knowledge

Look for evidence that confirms knowledge of:

- OHS procedures associated with vapour cycle air conditioning system maintenance, including the selection and use of PPE
- how to obtain applicable MSDS
- regulations applying to the evacuation and recharging of refrigerant
- fault diagnosis techniques
- vapour cycle air conditioning system layout and operation
- vapour cycle air conditioning system electrical and mechanical component operation:
  - compressor
  - condenser
  - receiver dryer
  - thermal expansion valve
  - evaporator
  - magnetic clutch and drive system:
    - belt
    - power takeoff
    - electric motor
    - hydraulic motor
    - pneumatic
  - condenser extension and retraction system

- blower
- throttle system shutoff
- temperature control system
- refrigerant used in aircraft vapour cycle air conditioning systems
- lubricants used in compressors
- equipment used to test systems and evacuate and recharge refrigerant
- procedures for evacuating and recharging system refrigerant
- refrigerant leak testing techniques and equipment
- removal and installation procedures for vapour cycle air conditioning system components
- vapour cycle air conditioning system maintenance requirements
- 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 apply hand skills, use maintenance publications and engine and system theory knowledge to inspect, test and troubleshoot vapour cycle air conditioning systems and to remove and install system components 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, troubleshooting and removal and installation tasks (including the timely involvement of supervisor or other trades) associated with vapour cycle air conditioning systems and components. It is essential that system testing procedures take into account all safety precautions associated with vapour cycle air conditioning system operation and testing, and that regulations relating to the evacuation and recharging of refrigerant be strictly observed.

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 vapour cycle air conditioning systems. Ability to interpret inspection procedures and specifications (allowable limits) and apply them in practice is critical. The application of testing procedures and functional checks should also indicate knowledge of system operation and regulations relating to refrigerant. Vapour cycle air conditioning system operation knowledge, the relationship of individual components and the links with other systems will be necessary to supplement evidence of ability to carry out engine control system checks and 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 a system and a representative range of components in Groups 1 to 6 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.
<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>Vapour cycle air conditioning systems</b>	<p>Vapour cycle air conditioning systems may include:</p> <ol style="list-style-type: none"> <li>1. Refrigeration system compressor, condenser, receiver dryer, thermal expansion valve and evaporator</li> <li>2. Magnetic clutch and drive system (belt, power takeoff, electric motor, hydraulic motor or pneumatic as applicable)</li> <li>3. Condenser extension and retraction system</li> <li>4. Blower</li> <li>5. Throttle system shutoff</li> <li>6. Temperature control system</li> </ol>
<b>Troubleshooting</b>	Troubleshooting involves the use of test sets, maintenance data and fault-finding charts or similar, to line replacement level
<b>Application</b>	<p>Application of this unit may relate to:</p> <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