



**Australian Government**

# **AURETU003 Service air conditioning and HVAC systems**

**Release: 1**

# AURETU003 Service air conditioning and HVAC systems

## Modification History

| Release   | Comment                 |
|-----------|-------------------------|
| Release 1 | New unit of competency. |

## Application

This unit describes the performance outcomes required to service air conditioning systems, including heating, ventilation and air conditioning (HVAC) systems, fitted to a range of vehicles and machinery. It involves preparing for the task, carrying out performance testing and correct servicing procedures, performing post-service testing, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. Automotive air conditioners, including HVAC systems, include those in agricultural machinery, heavy commercial vehicles, light vehicles or mobile plant machinery.

Licensing requirements apply to this unit. Users are advised to check with relevant regulatory authority. An Australian Refrigeration Council accredited (ARCtick) Refrigerant Handling licence is required for those carrying out this work.

## Competency Field

Electrical

## Unit Sector

Technical - Air Conditioning and HVAC

## Elements and Performance Criteria

| Elements                                  | Performance Criteria                                                                                                                                                                                        |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Elements describe the essential outcomes. | Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold and italicised text is used, further information is detailed in the range of conditions section. |
| 1. Prepare to service system              | 1.1 Job requirements are determined from workplace instructions<br>1.2 Service information, manufacturer specifications, and relevant                                                                       |

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|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                              | <p><i>code of practice</i> are accessed and interpreted</p> <p>1.3 Servicing options are analysed and those most appropriate to the circumstances are selected</p> <p>1.4 Hazards associated with the work are identified and risks are managed</p> <p>1.5 Servicing tools and equipment are selected and checked for serviceability</p>                                                                                                                                                                                                                                                                                            |
| 2. Test operation of system and components                   | <p>2.1 System is visually checked to establish extent of possible failure or damage</p> <p>2.2 System performance tests are carried out according to manufacturer specifications, workplace procedures, and <b>safety and environmental requirements</b>, and without causing damage to components or system</p> <p>2.3 Findings, including recommendations for required repairs or adjustments, are reported according to workplace procedures</p>                                                                                                                                                                                 |
| 3. Service system and components                             | <p>3.1 System and components are serviced according to manufacturer specifications, workplace procedures and relevant code of practice</p> <p>3.2 Code of practice regulations regarding topping up refrigerant are interpreted and applied during service procedures</p> <p>3.3 <b>Post-service performance tests</b> are carried out to confirm that reported service issue has been resolved and that no other problems are present</p>                                                                                                                                                                                          |
| 4. Complete work processes                                   | <p>4.1 Final inspection is made to ensure work is to workplace expectations and vehicle or machinery is presented ready for use</p> <p>4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected</p> <p>4.3 Tools and equipment are checked and stored and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures</p> <p>4.4 <b>Australian Refrigeration Council accredited (ARCtick) service decal sticker</b> and other required workplace documentation are completed and processed according to workplace procedures</p> |

## Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance and are not explicit in the performance criteria.

| Skills                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Learning skills to:                | <ul style="list-style-type: none"><li>locate appropriate sources of information efficiently.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Reading skills to:                 | <ul style="list-style-type: none"><li>interpret text, symbols and diagrams relating to service information in manufacturer specifications, and workplace instructions and procedures</li><li>interpret key requirements of Australian automotive code of practice relating to servicing air conditioning and HVAC systems.</li></ul>                                                                                                                                                                                                 |
| Writing skills to:                 | <ul style="list-style-type: none"><li>legibly and accurately fill out workplace documentation, including ARCTick stickers, when reporting test findings, making repair recommendations, and recording parts and material used.</li></ul>                                                                                                                                                                                                                                                                                             |
| Oral communication skills to:      | <ul style="list-style-type: none"><li>listen to workplace instructions and ask questions to clarify job requirements</li><li>participate in verbal exchanges to report faults, diagnostic and test findings and service repair recommendations to relevant personnel.</li></ul>                                                                                                                                                                                                                                                      |
| Numeracy skills to:                | <ul style="list-style-type: none"><li>match refrigerant types and identification numbers to workplace instructions, part lists, manufacturer specifications, and code of practice requirements</li><li>interpret weight measurements, including tare and gross weights</li><li>interpret readings on digital and analogue pressure gauges</li><li>measure temperatures and pressures, and use basic mathematical operations, including addition and subtraction, to calculate deviations from manufacturer specifications.</li></ul> |
| Planning and organising skills to: | <ul style="list-style-type: none"><li>plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.</li></ul>                                                                                                                                                                                                                                                                                                                                           |
| Technology skills to:              | <ul style="list-style-type: none"><li>use workplace technology and tools, such as refrigerant vacuum recovery equipment and manifold gauges.</li></ul>                                                                                                                                                                                                                                                                                                                                                                               |

## Range of Conditions

This section specifies 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. Bold italicised wording, if used in the performance criteria, is detailed below.

|                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>Code of practice</i></b> must include:                                                                        | <ul style="list-style-type: none"> <li>Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b><i>Safety and environmental requirements</i></b> must include:                                                   | <ul style="list-style-type: none"> <li>work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: <ul style="list-style-type: none"> <li>working with refrigerants at boiling point given risk of frostbite</li> <li>working with system lubricants, including carcinogenic oils</li> <li>identifying flammable refrigerants</li> <li>selecting and using personal protective equipment (PPE)</li> <li>identifying firefighting equipment</li> </ul> </li> <li>environmental requirements, including procedures for: <ul style="list-style-type: none"> <li>preventing loss of refrigerant to the atmosphere</li> <li>handling materials and refrigerant recovery equipment.</li> </ul> </li> </ul> |
| <b><i>Post-service performance tests</i></b> must include:                                                          | <ul style="list-style-type: none"> <li>temperature checks</li> <li>checking for refrigerant leaks.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b><i>Australian Refrigeration Council accredited (ARCTick) service decal sticker information</i></b> must include: | <ul style="list-style-type: none"> <li>name of service organisation</li> <li>ARCTick business authority number</li> <li>quantity of refrigerant added</li> <li>refrigerant and oil type</li> <li>service date</li> <li>technician name and licence number.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Unit Mapping Information

Equivalent to AURETU2003 Service air conditioning and HVAC systems

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

# Assessment Requirements for AURETU003 Service air conditioning and HVAC systems

## Modification History

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| Release 1 | New unit of competency. |

## Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in the unit's elements, performance criteria, range of conditions and foundation skills:

- service the air conditioning and HVAC systems of two different vehicles or machinery, in which the work must involve:
  - one air conditioning system
  - one heating, ventilation and air conditioning (HVAC) system
- complete Australian Refrigeration Council accredited (ARCTick) service decal stickers for the above jobs.

## Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to servicing air conditioning and HVAC systems, including procedures for:
  - working with refrigerants at boiling point given risk of frostbite
  - working with system lubricants, including carcinogenic oils
  - identifying flammable refrigerants
  - selecting and using personal protective equipment (PPE)
  - identifying firefighting equipment
- environmental requirements, including procedures for:
  - preventing loss of refrigerant to the atmosphere
  - handling materials and refrigerant recovery equipment.
- key requirements of Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners

- identification and function of major air conditioning and HVAC system components, including:
  - compressor
  - condenser
  - receiver-dryer
  - expansion valve
  - evaporator
  - blower fan
- principles of operation of air conditioning and HVAC systems, including transferring heat from cabin to exterior using refrigerant gas
- types of air conditioning and HVAC systems, including:
  - single zone and multi-zone
  - climate control
- inspection procedures for air conditioning and HVAC systems, including:
  - conducting visual, aural and functional assessments for:
    - component damage and wear
    - component corrosion
    - vacuum and leaks
  - system performance testing, including:
    - using manifold gauges and thermometers to check system pressures and vent temperatures
    - checking blower fan output
    - checking engine fan output
    - checking filters
  - using manifold gauges and thermometers to check pressure and temperatures
- service and adjustment procedures of air conditioning and HVAC systems, including:
  - checking and adjusting compressor drive belts
  - changing filters
  - clearing evaporator water outlet
  - cleaning condenser
- post-service testing procedures of air conditioning and HVAC systems, including system performance testing and using thermometers to check vent temperatures
- procedures for completing workplace documentation, including ARCTick service decal sticker.

## Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements and hold an Australian Refrigerant Council (ARC) Refrigerant Handling licence.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the air conditioning and HVAC systems that they have serviced, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive service repair workplace or simulated workplace
- workplace instructions
- air conditioning and HVAC system manufacturer specifications
- Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners
- two different vehicles or machinery with air conditioning and HVAC systems requiring servicing
- tools, equipment and materials appropriate for servicing air conditioning and HVAC systems, including:
  - thermometer
  - manifold and gauge set.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

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