



Australian Government

AURETU001 Install air conditioning systems

Release: 1

AURETU001 Install air conditioning systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to install automotive air conditioning systems in vehicles and machinery for driver and passenger convenience and comfort. It involves preparing for the task, installing and testing the operation of automotive air conditioning systems, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. Air conditioning systems include those being installed in agricultural machinery, heavy commercial vehicles, light vehicles or mobile plant machinery.

Licensing requirements apply to this unit. Users are advised to check with the relevant regulatory authority. An Australian Refrigeration Council (ARCtick) Restricted 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.

Elements Elements describe the essential outcomes.	Performance Criteria 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 install air conditioning system	1.1 Job requirements are determined according to workplace instructions 1.2 <i>Installation information</i> is sourced and interpreted 1.3 <i>Installation options</i> are considered and those most appropriate to the circumstances are selected 1.4 Hazards associated with the work are identified and risks are managed 1.5 Tools, equipment and materials are selected and checked for serviceability
2. Install air conditioning system components	2.1 Air conditioning system components are installed according to workplace procedures and <i>safety and environmental requirements</i> , and without causing damage to components and vehicle or machinery systems 2.2 Installation is visually checked prior to pressure testing and system charging
3. Charge air conditioning system with refrigerant and lubricating oil	3.1 System is pressure tested for leaks prior to being evacuated using approved methods and equipment 3.2 System is charged with appropriate refrigerant gas and lubricating oil according to manufacturer specifications, workplace procedures, and relevant industry code of practice
4. Test air conditioning system	4.1 Post-installation testing is carried out to ensure performance and operation comply with manufacturer specifications 4.2 Test results are reported according to workplace procedures
5. Complete work processes	5.1 Final inspection is made to ensure work is to workplace expectations and vehicle or machinery is presented ready for use 5.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 5.3 Tools and equipment are checked and stored and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 5.4 Workplace documentation, including <i>ARCTick service decal sticker</i> , is completed and processed according to workplace procedures

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:	locate appropriate sources of information efficiently.
Reading skills to:	- interpret information from manufacturer and workshop literature when seeking specifications and procedures - interpret requirements of the Australian automotive code of practice relating to installing automotive air conditioning systems.
Writing skills to:	legibly and accurately fill out workplace documentation, including ARCTick stickers, when reporting work performed and recording parts and material used.
Oral communication skills to:	- clarify instructions - report findings and make installation recommendations.
Numeracy skills to:	- match refrigerant types and identification numbers to workplace instructions, vehicle and component part lists, manufacturer specifications and regulatory requirements - interpret weight measurements, including tare and gross weights, and readings on digital and analogue pressure gauges - interpret measurements of temperature and pressure related to air conditioning system performance and compare with manufacturer specifications.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.
Technology skills to:	use workplace technology and specialist tools relating to installing and testing air conditioning systems.

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.

<i>Installation information</i> must include:	- manufacturer specifications - installation fitting instructions - Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or
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	de-commissioning of motor vehicle air conditioners.
Installation options must include:	- refrigerant types: - R134a - R1234yf - R290 and R600a blends - fluid levels: - refrigerant - lubricating oils - filter serviceability: - receiver dryer - cabin filter - O rings and seals - adjustments and operational testing - visual inspections and documentation.
Safety and environmental requirements must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: - working with refrigerants at boiling point given risk of frostbite - working with system lubricants, including carcinogenic oils - handling flammable refrigerants and refrigerant recovery equipment - selecting and using personal protective equipment (PPE) - identifying and using fire safety equipment - environmental requirements, including procedures for preventing loss of refrigerant to atmosphere.
ARClick service decal sticker information must include:	- name of the service organisation - ARClick business authority number - quantity of refrigerant added - refrigerant and oil type - service date - technician's name and licence number.

Unit Mapping Information

Equivalent to AURETU2001 Install air conditioning 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 AURETU001 Install air conditioning systems

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Performance Evidence

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

- install an air conditioning system in two different vehicles or machinery.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to installing air conditioning systems, including procedures for:
 - working with refrigerants at boiling point given risk of frostbite
 - working with system lubricants, including carcinogenic oils
 - handling flammable refrigerants and refrigerant recovery equipment
 - selecting and using personal protective equipment (PPE)
 - identifying and using fire safety equipment
- environmental requirements, including procedures for preventing loss of refrigerant to the atmosphere.
- methods for locating manufacturer specifications and workplace procedures, including safe operating procedures and current Australian automotive code of practice
- requirements of Automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners
- principal types of vehicle air conditioning systems, including:
 - piston, scroll and rotary vane compressors
 - electric compressors
 - variable displacement compressors
 - clutchless compressors

- application, purpose and operation of air conditioning systems, including:
 - climate control
 - multi-zone systems
- refrigerant types, operating pressures and suitable lubricating oils
- techniques for reading and interpreting technical information, including:
 - refrigerant saturation temperatures in relation to ambient temperatures and changing levels of humidity
 - graphic symbols and diagrams
- procedures for using and operating tools and equipment, including:
 - hand tools
 - manifold and gauge sets
 - refrigerant hoses and couplers
 - recovery units and vacuum pumps
 - electronic leak detector
 - nitrogen cylinder and regulator
 - digital vacuum gauge (vacrometer)
 - oil injector
 - infra-red thermometer (pyrometer)
 - electronic temperature probe
 - electronic scales
 - valve core removal or replacement tool
 - humidity detector (psychrometer)
 - multimeter
- procedures for installing air conditioning systems and components, including:
 - techniques for reading and interpreting technical information, wiring diagrams and graphic symbols
 - methods of determining wiring and connection type and size for system
 - methods of determining placement of components on vehicle or machinery
 - methods of connecting system and components to existing electrical system without causing damage or problems, including:
 - selecting and soldering wires
 - selecting and crimping terminals
 - removing and replacing connectors
- post-installation testing procedures, including:
 - validating effectiveness of installation, including checking for:
 - electrical connector mating
 - ambient temperature
 - centre vent temperature
 - condenser and suction line temperature
 - manifold gauge pressure readings

- refrigerant leaks
- procedures for completing workplace documentation, including ARCTick 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 systems that they have installed in vehicles or machinery, e.g. work 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 repair workplace or simulated workplace
- workplace instructions
- vehicle and machinery wiring specifications relevant to system and components being installed
- manufacturer air conditioning system 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 requiring installation of air conditioning systems
- material necessary to install air conditioning system components
- tools, equipment and materials appropriate for installing air conditioning system components, including:
 - manifold and gauge set
 - recovery unit
 - vacuum pump
 - electronic leak detector
 - nitrogen cylinder and regulator
 - digital vacuum gauge (vacrometer)
 - multimeter
 - electronic scales
 - oil injector
 - infra-red thermometer (pyrometer)
 - electronic temperature probe
 - valve core removal or replacement tool
 - humidity detector (psychrometer)
 - air conditioning gas appropriate to system being installed.

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