



Australian Government

AURETU101 Install air conditioning systems

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Modification History

Release	Comments
1	This unit of competency was first released in AUR Automotive Retail, Service and Repair Training Package Release 10.0.

Application

This unit describes the skills and knowledge required to install new automotive air conditioning systems in vehicles and machinery for occupants' comfort. It involves preparing for the task, installing and testing the operation of automotive air conditioning systems, and completing workplace processes and documentation.

This unit covers the installation of complete new automotive air conditioning system in a vehicle or machinery that has not previously had an air conditioning system installed. It does not include the replacement of individual system components with like-for-like components.

The unit 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. This unit does not apply to the installation of HVAC and rechargeable energy storage cooling systems in electric vehicles.

Licensing/Regulatory Information

Licensing requirements apply to this unit. Users are advised to check with the relevant regulatory authority.

An Australian Refrigeration Council (ARCTick) Automotive Refrigerant Handling licence is required for those carrying out this work. An ARCTick trainee licence is required to undertake this training.

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

Electrical

Unit sector(s)

Technical - Air Conditioning and HVAC

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to install air conditioning system	1.1 Identify job requirements from workplace instructions 1.2 Access and interpret installation information 1.3 Select installation options according to identified job requirements 1.4 Identify hazards and environmental issues associated with work tasks, assess potential risks and implement control measures in line with workplace policies and procedures 1.5 Identify tools and equipment for installing air conditioning system and check for serviceability according to workplace procedures.
2. Install air conditioning system components	2.1 Install air conditioning system components according to manufacturer instructions, Australian automotive refrigerant handling code of practice, workplace procedures and safety and environmental requirements 2.2 Visually check installation for component alignment, connection integrity and the absence of visible damage prior to leak checking and system charging.
3. Charge air conditioning system with refrigerant and lubricating oil	3.1 Check system for leaks prior to evacuating using approved methods and equipment according to manufacturer instructions, Australian automotive refrigerant handling code of practice, workplace procedures, and safety and environmental requirements 3.2 Charge system with appropriate refrigerant gas and lubricants according to manufacturer specifications, Australian automotive refrigerant handling code of practice, workplace procedures, and relevant industry code of practice
4. Test air conditioning system	4.1 Carry out post-installation testing to ensure performance and operation comply with manufacturer specifications 4.2 Report test results according to workplace procedures
5. Complete work processes	5.1 Conduct final inspection to ensure work is to workplace expectations and present vehicle or machinery ready for use 5.2 Clear work area and dispose of or recycle materials according to workplace procedures

	5.3 Check and store tools and equipment, and tag and isolate any faulty electrical equipment according to workplace procedures 5.4 Complete service label and workplace documentation according to workplace procedures
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Foundation skills

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

Skill	Description
Learning	• Locate appropriate sources of information efficiently
Reading	• Interpret information from manufacturer and workshop literature when seeking specifications and procedures • Interpret information from safety data sheets (SDS)
Writing	• Legibly and accurately fill out workplace documentation, including the service label appropriate to the work performed and the licence conditions held, when reporting work performed and recording parts and materials used
Oral communication	• Clarify instructions • Report findings and make installation recommendations
Numeracy	• Match refrigerant classes 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	• Plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes
Technology	• Use workplace technology and specialist tools relating to installing and testing air conditioning systems

Range of conditions

This section specifies different 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. Range is restricted to essential operating conditions and any other variables essential to the work environment.

<i>Installation information</i> must include:	• manufacturer specifications • installation instructions • Australian automotive refrigerant handling code of practice • safety data sheets (SDS).
<i>Installation options</i> must include:	• refrigerant class: ○ Class A1 – lower toxicity, no flame propagation ○ Class A2L – lower toxicity, lower flammability • fluid levels: ○ refrigerant ○ lubricant • filter serviceability: ○ receiver dryer ○ cabin filter • O-rings and seals • adjustments and operational testing • visual inspections and documentation.
<i>Safety and environmental requirements</i> must include:	• work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for: ○ managing risk of freeze burn and cold burns when handling refrigerants ○ working with system lubricants, including health and safety issues associated with refrigerant lubricants ○ handling flammable refrigerants, including appropriate use of refrigerant recovery equipment

	○ selecting and using personal protective equipment (PPE) ○ identifying and using fire safety equipment appropriate for refrigerant class ● environmental requirements, including procedures for preventing loss of refrigerant to atmosphere.
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Assessment Requirements for AURETU101 Install air conditioning systems

Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including evidence of the ability to:

- install a new air conditioning system on two separate occasions, using two different refrigerant classes:
 - one installation using a Class A1 refrigerant
 - one installation using a Class A2L refrigerant

Knowledge Evidence

The candidate must be able to demonstrate knowledge to complete the tasks outlined in the elements, performance criteria and foundation skills of this unit, including knowledge of:

- methods to locate and interpret information required to install new air conditioning systems, including:
 - manufacturer specifications and installation procedures
 - safe operating procedures
 - requirements of Australian automotive refrigerant handling code of practice
- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to installing air conditioning systems, including procedures for:
 - interpreting safety data sheets (SDS) for refrigerants and lubricants
 - refrigerant safety classifications and characteristics of gases relevant to automotive air conditioning systems, including:
 - Class A1 – lower toxicity, no flame propagation, including R-134a
 - Class A2L – lower toxicity, lower flammability, including R-1234yf
 - Class A3 – lower toxicity, higher flammability, including R-600
 - managing risk of freeze burn and cold burns when handling refrigerants
 - working with system lubricants, including health and safety issues associated with refrigerant lubricants
 - handling flammable refrigerants, including appropriate use of refrigerant recovery equipment
 - selecting and using personal protective equipment (PPE)
 - identifying and using fire safety equipment appropriate for refrigerant class
- environmental requirements under the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 and procedures in the Australian automotive

refrigerant handling code of practice relating to installation of motor vehicle air conditioning systems for:

- preventing loss of refrigerant to the atmosphere.
- principal types of vehicle air conditioning and HVAC system compressors, 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
- relevant refrigerant classifications (A1, A2L and A3), operating pressures and lubricating oils suitable for compressor types
- 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 for installing air conditioning systems, including:
 - hand tools such as pipe cutters, flaring tools and torque wrenches
 - manifold and gauge set, configured as either a standalone item or as an integrated component of a combined recovery, evacuation and charging unit
 - refrigerant hoses and couplers
 - recovery units and vacuum pumps
 - leak detection equipment appropriate to the refrigerant class and system being tested, such as:
 - oxygen-free nitrogen (OFN) cylinder and regulator for pressure testing
 - electronic leak detector compatible with the refrigerant class
 - vacuum pump and vacuum gauge for vacuum decay testing
 - 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 electrical 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 service label.

Assessment Conditions

Assessment of skills must take place under the following conditions:

- 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 refrigerant handling code of practice
- two vehicles or machinery, each requiring installation of a new air conditioning system
- material necessary to install air conditioning system components
- tools, equipment and materials appropriate for installing air conditioning system components, including:
 - manifold and gauge set (either as a standalone item or integrated into a combined recovery, evacuation and charging unit)
 - recovery unit
 - hand tools such as pipe cutters, flaring tools and torque wrenches
 - leak detection equipment appropriate to the refrigerant class and system being tested, such as:
 - oxygen-free nitrogen (OFN) cylinder and regulator for pressure testing
 - electronic leak detector compatible with the refrigerant class
 - vacuum pump and vacuum gauge for vacuum decay testing
 - multimeter
 - electronic scales
 - oil injector
 - infra-red thermometer (pyrometer)
 - electronic temperature probe
 - valve core removal or replacement tool
 - humidity detector (psychrometer)
 - refrigerant appropriate to the system being installed.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards; and hold an Australian Refrigeration Council (ARCTick) Automotive Refrigerant Handling Licence.

Mandatory Workplace Requirements

Assessment of performance evidence may be in a workplace setting or an environment that accurately represents a real workplace.

Unit Mapping Information

Previous Code and Title	Equivalence	Comments
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AURETU001 Install air conditioning systems	Equivalent	Supersedes and is equivalent to AURETU001 Install air conditioning systems
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Links

Companion volumes, including implementation guides, are found on the national training register - <https://training.gov.au/training/details/AUR>.

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