



Australian Government

AURETU107 Overhaul air conditioning and HVAC system compressors

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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 overhaul and return air conditioning and heating, ventilation and air conditioning (HVAC) system compressors to original manufacturer tolerances and clearances. It involves preparing for the task, dismantling and evaluating a removed compressor, carrying out the overhaul process, reassembling and testing the compressor, and completing workplace processes and documentation.

The unit applies to those working in the automotive service and repair industry. The air conditioning and HVAC system compressors include those fitted to agricultural machinery, heavy commercial vehicles, light vehicles or mobile plant machinery.

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
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<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare to dismantle air conditioning and HVAC system compressor	1.1 Identify job requirements from workplace instructions 1.2 Access and interpret Australian automotive refrigerant handling code of practice 1.3 Identify required information for overhaul activity 1.4 Analyse and select dismantling options appropriate to the circumstances 1.5 Identify hazards and environmental issues associated with overhaul activity, assess potential risks and implement control measures in line with workplace policies and procedures 1.6 Identify tools and equipment required for dismantling and check for serviceability according to workplace procedures
2. Dismantle and evaluate compressor and components	2.1 Dismantle compressor in a logical sequence according to manufacturer and workplace procedures, and safety and environmental requirements, without causing unnecessary damage to components or systems 2.2 Clean components and evaluate according to workplace procedures and safety and environmental requirements 2.3 Determine serviceability of components by measuring and comparing with manufacturer specifications 2.4 Determine component repair method 2.5 Identify unserviceable parts and source replacement parts
3. Carry out overhaul	3.1 Source and interpret overhaul information 3.2 Analyse overhaul options and select most appropriate to the circumstances 3.3 Select and check overhaul tools and equipment for serviceability according to workplace procedures 3.4 Machine, repair and replace components as required, and carry out adjustments according to manufacturer specifications, Australian automotive refrigerant handling code of practice, workplace procedures, and safety and environmental requirements, without causing damage to components or systems
4. Assemble and test compressor	4.1 Assemble compressor according to manufacturer specifications, workplace procedures, and safety and environmental requirements 4.2 Measure tolerances and clearances against manufacturer specifications and make necessary adjustments

	4.3 Complete assembly of compressor within workplace timeframes and without causing damage to other components or systems 4.4 Carry out post-assembly testing according to workplace procedures and safety and environmental requirements, and rectify any problems detected as having been introduced during the assembly process
5. Complete work processes	5.1 Conduct final inspection according to workplace procedures and confirm compressor is 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 documentation according to workplace procedures

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 sources of information relevant to compressor overhaul efficiently
Reading	• Interpret and assess information from manufacturer and workshop literature when seeking air conditioning and HVAC system compressor specifications and procedures • Interpret information from safety data sheets (SDS)
Writing	• Legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and materials used
Oral communication	• Clarify instructions, report evaluation findings and make overhaul recommendations
Numeracy	• Measure air conditioning and HVAC system components and use basic mathematical operations, including addition, subtraction, multiplication and division, to calculate distances, areas, volumes, tolerances and deviations from manufacturer specifications • Match refrigerant classes and identification markings to workplace instructions and vehicle and component part lists

	• Interpret weight measurements, including tare and gross weights, and readings on digital and analogue pressure gauges • Interpret measurements of temperature and pressure relating to air conditioner and HVAC system performance
Planning and organising	• Plan own work requirements and prioritise and sequence actions to achieve required outcomes and ensure tasks are completed within workplace timeframes
Technology	• Use precision measuring equipment, such as vernier calipers and micrometers • Use specialised air conditioning and HVAC system compressor overhaul equipment

Range of conditions

N/A

Assessment Requirements for AURETU107 Overhaul air conditioning and HVAC system compressors

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:

- overhaul two different types of air conditioning and HVAC system compressors from the following:
 - piston type (fixed or variable displacement)
 - scroll type
 - rotary vane type
 - variable displacement type
 - electric compressor
 - clutchless compressor
- carry out post-overhaul testing of the compressor and rectify any faults identified.

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 overhaul air conditioning and HVAC system compressors, including:
 - air conditioning and HVAC system compressor manufacturer specifications and overhauling procedures
 - Australian automotive refrigerant handling code of practice
- workplace procedures required to overhaul air conditioning and HVAC system compressors, including:
 - establishing the serviceability of tools and equipment
 - documentation procedures
 - housekeeping procedures, including:
 - examination of tools and equipment
 - storage of equipment
 - identification, tagging and isolation of faulty equipment
 - safe disposal of materials
 - recycling procedures

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to overhauling air conditioning and heating, ventilation and air conditioning (HVAC) system components, including procedures for:
 - interpreting safety data sheets (SDS) for refrigerants and lubricants
 - managing risk of freeze burn and cold burns when handling refrigerants
 - working with system lubricants, including health and safety issues associated with handling lubricant
 - handling automotive flammable refrigerants, including the specific risks associated with:
 - Class A2L – lower toxicity, lower flammability, including R-1234yf
 - Class A3 – lower toxicity, higher flammability, including R-600
 - using personal protective equipment (PPE)
 - identifying and using fire safety equipment
- environmental requirements, including procedures for preventing loss of refrigerant to the atmosphere.
- 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
- principal types of vehicle air conditioning and HVAC system compressors, including:
 - piston, scroll and rotary vane compressors
 - electric compressors
 - variable displacement compressors
 - clutchless compressors
- principal refrigerant classes and their respective operating pressures and lubricant requirements 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
- selection of suitable lubricants for air conditioning and HVAC system compressors according to compressor type and refrigerant class
- air conditioning and HVAC systems component overhaul procedures, including:
 - methods for cleaning and preparing air conditioning and HVAC system compressor for overhaul
 - air conditioning and HVAC system compressor dismantling procedures

- air conditioning and HVAC system compressor inspection, measuring and evaluation procedures, including methods for measuring and calculating tolerances and clearances
- air conditioning and HVAC compressor repair and adjustment procedures, including:
 - piston type, including variable displacement compressors
 - scroll type
 - rotary vane type
 - electric compressors
 - clutchless compressors and electromagnetic clutches
- procedures for tolerance measuring and calculating and adjusting components
- post-overhaul testing procedures, including:
 - visual, aural and functional assessments
 - bench testing of the overhauled compressor, including:
 - verification of lubricant type and charge
 - rotational check for smoothness and absence of seizure
 - clutch engagement and coil operation check
 - pressure-hold or vacuum-hold leak test of the sealed compressor
 - in-vehicle or in-machinery testing of the fitted compressor, including:
 - manifold gauge pressure readings (high and low side)
 - discharge line temperature
 - liquid line temperature
 - suction line temperature
 - refrigerant leak detection
 - diagnostic trouble codes (DTCs) related to compressor operation.

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 and HVAC compressors that they have overhauled, 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 repair workplace or simulated workplace
 - workplace instructions
 - Australian automotive refrigerant handling code of practice
 - manufacturer specifications for air conditioning and HVAC system compressors
 - two different air conditioning or HVAC system compressors from different vehicles or machinery that meet the requirements specified in the performance evidence
 - a vehicle or machinery, a compressor test bench or equivalent equipment for post-overhaul testing
 - tools, equipment and materials appropriate for overhauling, adjusting and testing a range of air conditioning and HVAC compressors.

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
AURETU007 Overhaul air conditioning and HVAC system compressors	Equivalent	Supersedes and is equivalent to AURETU007 Overhaul air conditioning and HVAC system compressors

Links

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