Australian Government

AURETU005 Retrofit and modify air conditioning and HVAC systems

Release: 1

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Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to retrofit and modify 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, selecting the correct de-gas procedure, carrying out the retrofit and modification procedures, performing post-modification testing, and completing workplace processes and documentation.

Air conditioning systems may contain a mixture of both natural and flammable synthetic refrigerants that are difficult to accurately identify and safely recover. To minimise the possibility of ignition, the procedures and equipment used when recovering refrigerants must be those required for flammable refrigerants.

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 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 retrofit system	1.1 Job requirements are determined from workplace instructions 1.2 Retrofit information, manufacturer specifications, and relevant ***code of practice*** are accessed and interpreted 1.3 Type of refrigerant is determined according to workplace procedures and ***safety and environmental requirements*** 1.4 Retrofit options are analysed and those most appropriate to the circumstances are selected 1.5 Hazards associated with the work are identified and risks are managed 1.6 Retrofit tools and equipment are selected and checked for serviceability
2. De-gas system	2.1 System de-gas procedures are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements, and without causing damage to components or system 2.2 Refrigerant is recovered into appropriate refrigerant recovery cylinder for the refrigerant type 2.3 Oil recovered is measured to determine replacement volume 2.4 System is evacuated according to manufacturer specifications, workplace procedures, and safety and environmental requirements
3. Retrofit system	3.1 Technical information relating to vehicle or machinery being retrofitted is accessed and interpreted 3.2 Air conditioning retrofit modification procedures are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.3 System is pressure tested for leaks before being re-gassed according to manufacturer specifications, workplace procedures, and safety and environmental requirements 3.4 System is re-gassed with appropriate refrigerant gas and lubricating oil according to manufacturer specifications and workplace procedures 3.5 Post-modification testing is carried out according to workplace procedures and test results are checked to confirm system performance is operating to manufacturer specifications, reported pre-modification issue has been resolved, and no other faults are present

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4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and the vehicle or machinery is presented ready for use 4.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected 4.3 Tools and equipment are checked and stored and any faulty electrical equipment is identified, tagged and isolated according to workplace procedures 4.4 ***Australian Refrigeration Council accredited (ARCtick) service decal sticker*** and other required workplace documentation are 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 text, symbols and diagrams relating to retrofit and modification information from manufacturer specifications, and workplace instructions and procedures • interpret key requirements of Australian automotive code of practice relating to retrofitting and modifying air conditioning and HVAC systems.
Writing skills to:	• legibly and accurately fill out workplace documentation, including ARCtick stickers, when reporting test findings, making modification recommendations, and recording parts and material used.
Oral communication skills to:	• listen to workplace instructions and ask questions to clarify job requirements.
Numeracy skills to:	• match refrigerant types and identification numbers to workplace instructions, vehicle and component part lists, and code of practice requirements • interpret weighting measurements, including tare and gross weights

Skills	Description
	• interpret readings on digital and analogue pressure gauges • measure temperatures and pressures, and use basic mathematical operations, including addition and subtraction, to calculate deviations from 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 tools, such as refrigerant analyser, vacuum recovery equipment and manifold gauges.

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.

Code of practice must include:	• Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners.

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
	  • identifying flammable refrigerants, including hydrocarbon (HC) 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.

Australian Refrigeration Council accredited (ARCtick) service decal sticker information must include:	• name of the service organisation • ARCtick business authority number • quantity of refrigerant added • refrigerant and oil type • service date • technician name and licence number.

Unit Mapping Information

Equivalent to AURETU3005 Retrofit and modify 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