Australian Government

Assessment Requirements for AURETU004 Diagnose and repair air conditioning and HVAC systems

Release: 1

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Modification History

Release	Comment
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 and performance criteria, range of conditions and foundation skills:

- diagnose and repair a fault in the air conditioning and heating, ventilation and cooling (HVAC) systems of two different vehicles or machinery, in which the work must involve removing, refitting or replacing two of the following:
  - condenser
  - evaporator
  - expansion valve
  - compressor
  - heater box.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to diagnosing and repairing 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
  - handling flammable refrigerants
  - using personal protective equipment (PPE)
  - identifying and using fire safety equipment
- environmental requirements, including procedures for preventing loss of refrigerant to the atmosphere

- key requirements relevant to diagnosing and repairing air conditioning and HVAC systems detailed in the Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners
- air conditioning and HVAC system principles, including:
  - heat transfer principles, including convection, conduction and radiation
  - functions of the following air conditioning components:
    - compressor
    - condenser
    - receiver-drier
    - evaporator
    - blower fan
    - refrigerant
  - functions of the following heating components:
    - radiator
    - thermostat
    - radiator and heater hoses
    - heater tap
    - heater box
  - single zone and multi-zone vehicle layouts
- application, purpose and operation of air conditioning and HVAC systems and components, including:
  - high pressure and low pressure sides of air conditioning systems
  - compressors, including:
    - axial type, including variable capacity compressors
    - scroll type
    - vane type
  - electromagnetic clutches
  - condensers
  - receiver-dryer, including filters and desiccants
  - expansion valves, including capillary tube
  - evaporator
  - thermostat
  - refrigerants, including R12, R134, R1234yf and hydrocarbon refrigerants
  - compressor oils
  - air conditioner and heating controls, including levers and ducting
  - air conditioner and heating electrical circuits and sensors, including:
    - high and low pressure switches
    - pressure relief valves
    - temperature sensors

    - climate control systems
- diagnostic testing procedures for air conditioning and HVAC systems, including:
    - using diagnostic flow charts
    - using manifold gauges on systems with different refrigerants, including analysis of high and low pressure readings in conjunction with temperature probes
    - testing electrical systems, including procedures for:
        - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
        - resistance and voltage drop tests
        - open and short circuit tests
        - checking shorts to signal, power circuits and grounds
- repair procedures for air conditioning and HVAC systems, including procedures for:
    - using manifold gauges to discharge, evacuate and charge system refrigerants
    - removing and replacing system components
- post-repair testing procedures for air conditioning and HVAC systems, including procedures for checking for:
    - refrigerant leaks
    - heater core and system water coolant leaks
- static and dynamic performance tests of air conditioning and HVAC systems, including checking:
    - ambient temperature
    - vent temperature
    - condenser and suction line temperature.

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 worked on, 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
- manufacturer specifications for air conditioning and HVAC systems

- Australian automotive code of practice: Control of refrigerant gases during manufacture, installation, servicing or de-commissioning of motor vehicle air conditioners
- ARCtick service decal stickers
- procedures for servicing and adjusting vehicle air conditioning and HVAC systems
- two different vehicles or machinery with air conditioning and HVAC system faults
- diagnosis and repair equipment for air conditioning and HVAC systems, including:
  - manifold and gauge set
  - recovery unit
  - vacuum pump
  - electronic leak detector
  - nitrogen cylinder and regulator
  - multimeter
  - electronic scales
  - oil injector
  - infra-red thermometer
  - temperature probe
  - scan tool.

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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