



Australian Government

AURTTC003 Diagnose and repair cooling systems

Release: 1

AURTTC003 Diagnose and repair cooling systems

Modification History

Release	Comment
Release 1	New unit of competency.

Application

This unit describes the performance outcomes required to diagnose and repair faults in the cooling systems of vehicles. It involves preparing for the task, selecting the correct diagnostic procedure, carrying out the diagnosis and the repair, performing post-repair testing, and completing workplace processes and documentation.

It applies to those working in the automotive service and repair industry. The cooling systems include those in agricultural machinery, heavy commercial vehicles, light vehicles, mobile plant machinery, motorcycles or outdoor power equipment.

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Competency Field

Mechanical Miscellaneous

Unit Sector

Technical – Cooling Systems

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.
1. Prepare to diagnose and repair cooling system	1.1 Job requirements are determined from workplace instructions 1.2 Diagnostic information is sourced and interpreted 1.3 Diagnostic options are analysed and those most appropriate to the circumstances are selected

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.
	1.4 Hazards associated with the work are identified and risks are managed 1.5 Diagnostic tools and equipment are selected and checked for serviceability
2. Diagnose cooling system	2.1 Diagnostic tests are performed according to workplace procedures, <i>safety and environmental requirements</i> 2.2 Faults are identified from diagnostic test results and causes of faults are determined 2.3 Diagnosis findings are reported according to workplace procedures, including recommendations for necessary repairs or adjustments
3. Repair cooling system	3.1 Repair information is sourced and interpreted 3.2 Repair options are analysed and those most appropriate to the circumstances are selected 3.3 Repair tools, equipment and materials are selected and checked 3.4 Repairs and component replacements and adjustments are carried out according to manufacturer specifications, workplace procedures, and safety and environmental requirements, and without causing damage to components or system 3.5 Post-repair testing is carried out according to workplace procedures to confirm fault rectification, and any further problems detected as having been introduced during the repair process are rectified
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and vehicle 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 according to workplace procedures 4.4 Workplace documentation is 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 cooling system specifications and procedures.
Writing skills to:	legibly and accurately fill out workplace documentation when reporting diagnostic findings, making repair recommendations, and recording parts and material used.
Oral communication skills to:	- clarify instructions - report diagnostic findings and make repair recommendations.
Numeracy skills to:	- interpret pressure gauges and metric units of pressure - use basic mathematical operations, including addition, subtraction, multiplication and division and subtraction, to calculate volumes from ratios.
Planning and organising skills to:	plan own work requirements and prioritise actions to achieve required outcomes and ensure tasks are completed within workplace timeframes.

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>Safety and environmental requirements</i> must include:	- work health and safety (WHS) and occupational health and safety (OHS) requirements, including procedures for handling hot pressurised cooling systems - environmental requirements, including procedures for trapping, storing and disposing of fluids released from cooling systems.
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Unit Mapping Information

Equivalent to AURTTC3003 Diagnose and repair cooling 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 AURTTC003 Diagnose and repair cooling 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:

- diagnose and repair a fault in two different cooling systems, in which the work must involve:
 - removing and refitting or replacing all of the following components:
 - radiator
 - water pump
 - engine core plugs
 - removing and refitting or replacing two of the following components:
 - thermostat
 - radiator hoses and heater hoses
 - heater core
 - heater valve
 - heat exchanger
 - engine fan system.

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 cooling systems, including procedures for handling hot pressurised cooling systems
- environmental requirements, including procedures for trapping, storing and disposing of fluids released from cooling systems
- operating principles of cooling systems and associated components, including:

- effects of heat, including changes of temperature, colour, state and volume of substances
- heat transfer, including conduction, convection and radiation
- air cooled systems
- liquid cooled systems
- application, purpose and operation of the following components of cooling systems and components, including:
 - engine coolant types and composition
 - water pumps
 - thermostats and bypass systems
 - mechanical, hydraulic, pneumatic and electric cooling fan systems
 - radiators and radiator caps
 - heat exchangers
 - expansion tanks
 - hoses
 - drive belts
 - temperature sensors and gauges
- diagnostic testing procedures for cooling systems, including testing procedures for:
 - effects of corrosion, cavitation and electrolysis
 - transient voltage
 - engine coolant
 - cooling system pressure
 - combustion leak
 - cooling fan system
 - thermostat
 - infra-red thermal devices
 - cooling system hose
 - water pump
- repair procedures for cooling systems, including procedures for bleeding coolant systems
- post-repair testing procedures for cooling systems, including:
 - fan system operation
 - thermostat operation.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

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 cooling 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 cooling system specifications
- two different vehicles or machinery with cooling system faults
- diagnostic equipment for cooling systems
- tools, equipment and materials appropriate for repairing cooling systems.

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