



Australian Government

AURTTC103 Diagnose and repair cooling systems

Release: 1

AURTTC103 Diagnose and repair cooling systems

Modification History

Release	Comments
Release 1	This version first released with AUR Automotive Retail, Service and Repair Training Package Version 6.0

Application

This unit describes the skills and knowledge required to diagnose and repair faults in the cooling systems of vehicles. The systems used vary based on the work context. It involves preparing for the task, sourcing a diagnostic testing strategy, diagnosing the cause of the fault, carrying out the repair, performing post-repair testing, and completing workplace processes and documentation.

The unit applies to those who work 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.

Unit Sector

Mechanical Miscellaneous Technical – Cooling Systems

Elements and Performance Criteria

ELEMENT	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 diagnose and repair cooling system	1.1 Identify job requirements from workplace instructions 1.2 Identify required information for diagnosis activity 1.3 Analyse diagnostic options and source testing strategy to identify cause of fault using workplace and manufacturer procedures 1.4 Identify hazards and environmental issues associated with diagnose and repair activity, assess potential risks and implement control measures in line with workplace policies and procedures

ELEMENT	PERFORMANCE CRITERIA
	1.5 Identify tools and equipment required for testing strategy and establish serviceability according to workplace procedures
2. Diagnose cooling system	2.1 Implement diagnostic tests set out in testing strategy according to manufacturer and workplace procedures, and workplace health and safety requirements 2.2 Identify cause of fault through analysis of diagnostic test results 2.3 Confirm and report cause of fault according to workplace procedures 2.4 Develop and report recommendations for necessary repairs according to workplace procedures
3. Repair cooling system	3.1 Identify required information for repair activity 3.2 Identify required repair tools, equipment and materials required for repair activity and establish serviceability according to workplace procedures 3.3 Carry out repairs according to workplace and manufacturer procedures, manufacturer specifications, workplace health and safety and environmental requirements 3.4 Refill system with required coolant and water mix according to manufacturer specifications, workplace procedures and workplace health and safety and environmental requirements 3.5 Carry out post-repair testing according to workplace procedures, workplace health and safety and environmental requirements
4. Complete work processes	4.1 Conduct final inspection according to workplace procedures and confirm vehicle is ready for use 4.2 Clear work area and dispose of or recycle materials according to workplace procedures 4.3 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	- Locates required sources of information efficiently - Develops a sequenced plan for a specific task
Reading	Interprets information from manufacturer and workshop literature when seeking cooling system specifications and

SKILL	DESCRIPTION
	procedures
Oral communication	• Clarifies instructions • Obtains information from customers and supervisors
Numeracy	• Interprets pressure gauges and metric units of pressure • Uses mathematical operations to calculate volumes from ratios
Planning and organising	• Plans own work requirements • Prioritises actions to achieve required outcomes • Ensures tasks are completed within workplace timeframes.

Unit Mapping Information

Supersedes and is equivalent to AURTTC003 Diagnose and repair cooling systems.

Links

Companion Volume Implementation Guide is found on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

Assessment Requirements for AURTTC103 Diagnose and repair cooling systems

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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:

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

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 diagnose and repair cooling systems, including:
 - information provided by customer and supervisors
 - cooling system manufacturer specifications
- workplace procedures required to diagnose and repair cooling systems, 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
- workplace health and safety (WHS) requirements relating to diagnosing and repairing cooling systems, including:
 - procedures for handling hot pressurised cooling systems
- environmental requirements relating to diagnosing and repairing cooling systems, 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
- 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
 - pressure caps
 - heat exchangers
 - expansion tanks
 - hoses
 - drive belts
 - temperature sensors and gauges
- diagnostic testing procedures for cooling systems, including testing procedures for:
 - accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs)
 - live data
 - freeze frame data
 - waveforms
 - effects of corrosion, cavitation and electrolysis
 - transient voltage
 - engine coolant

- cooling system pressure
- combustion leak
- cooling fan system
- thermostat
- temperature sensors/senders
- 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
 - checks for leaks.

Assessment 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 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.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

Links

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