

Title	Analyse vehicle or machine cooling system problems and requirements		
Level	5	Credits	4

Purpose	This unit standard is for people in the automotive repair industry. People credited with this unit standard are able to: demonstrate knowledge of vehicle or machine cooling system requirements; and diagnose cooling system faults and their causes.
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Classification	Motor Industry > Engine Repairs
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Available grade	Achieved
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Entry information

Critical health and safety prerequisites	Unit 878, <i>Repair an engine cooling system</i> , or demonstrate equivalent knowledge and skills.
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Explanatory notes

- 1 The following legislation and amendments are required to be consulted and followed where applicable:
Health and Safety in Employment Act, 1992;
Resource Management Act, 1991 (disposal of coolant and chemicals).
- 2 Reference to *suitable tools and equipment* means industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task to a professional and competent manner with due regard to safe working practices.

This unit standard is expiring

Outcomes and evidence requirements

Outcome 1

Demonstrate knowledge of vehicle or machine cooling system requirements.

Evidence requirements

- 1.1 Factors that influence cooling system performance are explained according to manufacturer's workshop manual explanations.
- Range driving or operating conditions, engine condition, vehicle performance and condition, lack of maintenance.
- 1.2 Engine cavitation, erosion, and corrosion problems affected by cooling system operation are described according to manufacturer's workshop manual descriptions.
- Range action of system components and coolant causing damage to engine components.
- 1.3 Cooling system corrosion control methods are described according to manufacturer's workshop manual descriptions.
- Range sacrificial anodes, electrical bonding straps, coolant treatment.
- 1.4 The use of water filters and water conditioners is identified in protecting an engine.
- 1.5 Cooling system checks for an engine that has not been operating for some time are described according to manufacturer's workshop manual descriptions.
- Range visual including dismantling components, flushing, pressure testing, testing operation.
- 1.6 Methods used to detect the actual engine temperature are described according to manufacturer's workshop manual descriptions.
- Range thermometer, temperature sensor probes, temperature sensitive crayons.
- 1.7 The use of chemical cleaning compounds when system flushing is explained according to manufacturer's instructions.
- Range contaminated cooling systems.
- 1.8 Heat exchanger and cooler operation and servicing requirements are described according to vehicle, engine, or component manufacturers' instructions.

- 1.9 Cooling system after-boil and its causes and effects are identified.
- Range cooling system performance, engine faults and damage.
- 1.10 The cooling system requirements when repowering a vehicle or machine are identified.
- Range replacement engine specifications different from replaced unit.
- 1.11 Types of engine protection systems and their operation in the event of cooling system failure are described according to manufacturer's workshop manual descriptions.
- Range electronic monitoring.

Outcome 2

Diagnose cooling system faults and their causes.

Range overheating, failing to reach recommended operating temperature.

Evidence requirements

- 2.1 Safe working practices are observed throughout the task.
- Range personal safety, safety of others, equipment, vehicle and machine safety.
- 2.2 Suitable tools and test equipment are selected and used to enable cooling system faults to be diagnosed.
- 2.3 A visual inspection of the cooling system is performed, all faults are identified and recorded, and any minor servicing faults are rectified.
- 2.4 The vehicle or machine is operated to reproduce the symptoms of the fault(s), and all relevant details concerning the symptoms and the conditions when they occur are identified and recorded.
- 2.5 Efficiency tests are carried out on the cooling system, and any faults and their causes are identified and recorded.
- Range air flow and air circulation, coolant circulation, coolant temperature, coolant condition, pressure loss.
- 2.6 A written recommendation on cooling system repair requirements and suggested remedial action to be taken is made to the supervisor or customer.

Replacement information	This unit standard, unit standard 878, and unit standard 3391 have been replaced by unit standard 24269, unit standard 24270, and unit standard 24271.
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	9 November 1993	31 December 2016
Review	2	4 October 1996	31 December 2016
Review	3	26 February 1999	31 December 2016
Review	4	25 January 2008	31 December 2020
Rollover	5	19 November 2010	31 December 2020
Rollover	6	22 August 2014	31 December 2020

Consent and Moderation Requirements (CMR) reference	0014
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMR). The CMR also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.