Title	**Tune and test a four-stroke diesel engine**		
Level	**4**	**Credits**	**6**

Purpose	This unit standard is intended for people in the automotive repair industry. People credited with this unit standard are able to: carry out a four-stroke diesel engine inspection and rectify defects prior to tuning; carry out four-stroke diesel engine tuning procedures; and test four-stroke diesel engine performance.

Classification	Motor Industry > Engines

Available grade	Achieved

Prerequisites	Appropriate driver licence for the vehicle being driven.

Guidance Information

1 It is recommended that people hold credit for Unit 31391, *Test and repair diesel fuel injectors*, and Unit 21692, *Perform minor servicing tasks on a diesel fuel system* before being assessed against this unit standard.

2 Evidence presented for assessment against this unit standard must be consistent with safe working practices and be in accordance with applicable service information, and company requirements and legislative requirements. This includes the knowledge and use of suitable tools and equipment.

3 Performance of the outcomes of this unit standard must comply with the following:
Health and Safety at Work Act 2015;
Land Transport Rule: Vehicle Exhaust Emissions 2007;
Land Transport Rule: Vehicle Repair 1998;
The Official New Zealand Road Code.

4 Any new, amended or replacement Acts, regulations, standards, codes of practice, guidelines, or authority requirements or conditions affecting this unit standard will take precedence for assessment purposes, pending review of this unit standard.

5 Definitions
Company requirements refer to instructions to staff on policy and procedures that are available in the workplace. These requirements may include – company policies and procedures, work instructions, product quality specifications and legislative requirements.

Service information refers to technical information for a vehicle, machine, or product detailing operation; installation and servicing procedures; manufacturer instructions; technical terms and descriptions; and detailed illustrations.
Suitable tools and equipment refer to industry approved tools and equipment that are recognised within the industry as being the most suited to complete the task in a professional and competent manner with due regard to safe working practices.

Outcomes and performance criteria

Outcome 1

Carry out a four-stroke diesel engine inspection and rectify defects prior to tuning.

Performance criteria

1.1 The engine and cooling system are inspected. Any oil, coolant, and fuel leaks, and signs of overheating are recorded.

1.2 Driving belts are checked for condition and tension, and are replaced and adjusted to restore full serviceability.

1.3 Loose or disconnected wires and connectors are connected or secured so that full electrical conductivity is restored.

1.4 Oil, coolant, and electrolyte levels are topped up.

1.5 Hoses and clamps are checked for condition and security and are repaired or replaced to restore full serviceability.

1.6 Rods and linkages are checked for wear and security and are repaired or replaced to restore full serviceability.

1.7 Air and fuel filters are checked for condition and are cleaned or replaced to restore full serviceability.

1.8 Air pressure readings are measured, and results are recorded.

Range crankcase pressure, exhaust back pressure, air intake restrictions.

1.9 Air inlet is checked, and restrictions are rectified to restore full serviceability of the system.

1.10 Exhaust back pressure is checked, and faults are rectified.

1.11 Fuel pressure is checked and compared to manufacturer specifications, and any faults are rectified.

Outcome 2

Carry out four-stroke diesel engine tuning procedures.

Performance criteria

2.1 Fuel primary and secondary filters are changed, and are assembled with new seals ensuring no air can enter, or fuel leak from the system.

2.2 Area around the injection pump drive is cleaned so that any pump timing marks are identified.

2.3 The type of pump coupling is identified.

Range may include but is not limited to – adjustable, non-adjustable, automatic advance.

2.4 Pump coupling and drive train are checked for security and alignment, and any discrepancies are rectified.

2.5 Backlash in the drive train is checked and any excess beyond the manufacturer's permitted maximum is rectified by adjustment or replacement of worn parts.

2.6 The diesel fuel injection pump is timed to the engine.

2.7 Engine is run to ensure the injection pump operates.

Range checks – security, performance, no leaks, drive train aligned, pipes and fittings secure, no air in system.

2.8 Low and high idle governed speed are set.

2.9 Engine idle speed is set.

2.10 Supplementary governing device (if fitted) is adjusted.

2.11 Exhaust emissions are visually checked.

Outcome 3

Test four-stroke diesel engine performance.

Performance criteria

3.1 Engine is operated until the optimum operating temperature is reached before any tests are carried out.

3.2 Engine is tested replicating its normal usage, and the test results are recorded.

Replacement information	This unit standard, unit standard 24278, and unit standard 24280 replaced unit standard 967, unit standard 15448, and unit standard 15449.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	25 January 2008	31 December 2022
Review	2	29 April 2021	N/A

Consent and Moderation Requirements (CMR) reference	0014

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact MITO New Zealand Incorporated info@mito.org.nz if you wish to suggest changes to the content of this unit standard.