



Section 11

Engine, Driveline and Exhaust

Objective:

To ensure the engine, driveline and associated components provide a controlled transmission of power to the driving wheels.

Australian Design Rules relevant to this section

ADR 30	Smoke Emission Control for Diesel Vehicles
ADR 42	General safety requirements
ADR 44	Specific purpose vehicle requirements
ADR 58	Requirements for omnibuses designed for hire and reward
ADR 65	Maximum road speed limiting for heavy goods vehicles and heavy omnibuses
ADR 80	Emission control for heavy vehicles
ADR 83	External noise

11.1. Check exhaust system

Reasons for rejection

- a. Any component of the exhaust system is not securely mounted
- b. Exhaust system does not incorporate an effective silencing device that all exhaust gases pass through
- c. The exhaust system contacts any unrelated part of the vehicle
- d. The exhaust outlet on a heavy motor vehicle, other than a bus or goods carrying vehicle with a GVM less than 12 tonnes, does not extend:
 - beyond the rear most seating position, and
 - at least 40mm past the outermost joint of the floor pan that is not continuously welded or permanently sealed, or
 - where the body of the vehicle is permanently enclosed and not fitted with a vertical exhaust system, to the edge of the vehicle.
- e. The exhaust outlet on a bus:
 - is not as near as practicable to the rear of the vehicle
 - extends past the edge of the vehicle at its widest point
- f. Exhaust pipe outlet is not rearward of all rear passenger doors or sleeper compartment that may allow the ready entrance of exhaust gases
- g. There is any leak in the exhaust system (excluding manufacturers' drain holes in the mufflers)
- h. A vertical exhaust does not extend at least 150mm above the cab of the vehicle.
- i. The outlet on a vertical exhaust does not discharge the exhaust flow straight up:

Section 11 - Engine, Driveline and Exhaust

- at an angle above the horizontal; and
 - towards the rear, or right, of the vehicle
- j. A catalytic converter and/or particle filter is missing, bypassed or has a missing heat shield

⚠ Not all heavy vehicles are built with heat shields, catalytic converter and/or particle filters.

- k. Any exhaust component that fouls any part of the steering, suspension, brake or fuel system
- l. Any part of the exhaust system liable to be contacted by a person touching or leaning on it, is not protected by suitable guarding to prevent injury.
- m. For a bus, flammable material is located 100mm of the exhaust without shielding.

11.2. Check noise emissions

Where it is evident that a vehicle is emitting significantly higher noise than normal, the vehicle must not pass the inspection. The operator must be referred to a facility where a stationary noise test must be conducted in accordance with Table 11.1.

For a vehicle that has a silencing device designed to be adjusted by the vehicle's operator, the device must be tested in the worst-case configuration.

Table 11.1 Noise limits for diesel-powered heavy vehicles

Gross Vehicle Mass (kg)	Height above ground of end of exhaust pipe (mm)	Manufacture period	Noise level dB(A)
More than 4500, but not more than 12,000	1500 or more	Before 1/7/80	103
		On or after 1/7/80 and before 1/7/83	100
		On or after 1/7/83	97
More than 4500, but not more than 12,000	less than 1500	Before 1/7/80	107
		On or after 1/7/80 and before 1/7/83	104
		On or after 1/7/83	101
More than 12,000	1500 or more	Before 1/7/80	105
		On or after 1/7/80 and before 1/7/83	102
		On or after 1/7/83	99
More than 12,000	less than 1500	Before 1/7/80	109
		On or after 1/7/80 and before 1/7/83	106
		On or after 1/7/83	103

⚠ Appropriate tolerances on noise values should be applied.

Table 11.2 Noise limits for heavy vehicles with spark ignition engines

Height above ground of end of exhaust pipe (mm)	Manufacture period	Noise level dB(A)
Less than 1500	Before 1/7/83	98
	On or after 1/7/83	95
1500 or more	Before 1/7/83	94
	On or after 1/7/83	91

⚠ Appropriate tolerances on noise values should be applied.

11.3. Check engine and driveline

Reasons for rejection

- a. Engine and driveline mounts or driveline components are loose, cracked, broken or are missing components or fasteners
- b. A bus fitted with a transmission that incorporates a longitudinal drive shaft is not fitted with a device that prevents the front of the drive shaft from contacting the road in the event of becoming detached from its normal position (tail shaft guard)
- c. Any universal joint or securing bolts are loose or missing
- d. Constant velocity joints, universal joints, support bearings, splines, and other driveline components are not secure, excessive wear, back lash (as per manufacturer's specifications) or seizure which could cause component failure
- e. Engine and transmission controls are inoperative
- f. A vehicle fitted with an automatic transmission is capable of being started when the transmission control is in a position to drive the vehicle

This section must be read in conjunction with *National Stationary Exhaust Noise Test Procedures for In-Service Motor Vehicles* which can be obtained from the National Transport Commission website at www.ntc.gov.au

Reasons for rejection

- a. Any noise reducing or absorbing equipment is missing

⚠ Changes to the original design of the engine, fuel system, air inlet system, or exhaust system all have the potential to affect compliance of the vehicle with noise standards. Where any such modifications have been carried out a noise test may be necessary to ensure that the vehicle complies with the exhaust noise limits.

Such modifications could also affect compliance with exhaust emission requirements and the operator may be directed to have the vehicle tested.

- b. For a vehicle certified to comply with ADR 83, the vehicle exceeds the certified noise level for the vehicle by more than 5dB(A)

⚠ Stationary noise level values for vehicles can be found on the Road Vehicle Certification System website: <http://rvcs.infrastructure.gov.au>

- c. For a vehicle not certified to comply with ADR 83, the noise level from the vehicle exceeds the Figure in Tables 11.1 or 11.2 (as applicable).

Section 11 - Engine, Driveline and Exhaust

- g. A vehicle fitted with a compression ignition engine (diesel) that is not fitted with a device that prevents the engine from inadvertently being started
- h. Seals on covers between the engine and the passenger compartment are missing, distorted or damaged in a way that allows fumes to enter the passenger compartment
- i. Engines without a diesel particulate filter emits excessive smoke for at least 10 seconds continually at or near the discharge end of the exhaust pipe
- j. Apart from during a regeneration cycle, an engine equipped with a diesel particulate filter shows visible signs of smoke
- k. Vehicles manufactured with emission control devices do not have all emission control equipment (including diesel exhaust fluids) properly located, connected or are damaged, deteriorated or altered in any way to reduce effectiveness

✎ Modifications to emission equipment can affect smoke emission.

- l. Crankcase gases escape into the atmosphere (applies to petrol engines fitted with positive crankcase ventilation only)
- m. The engine lets out sparks, flames, oil or fuel residue
- n. Air cleaners are not fitted
- o. Fuel injection equipment, engine speed governor or any other part of an engine is adjusted so that it increases smoke
- p. The following types of vehicles, which must comply with ADR 65, the maximum road speed limiting is greater than 100km/h or there is evidence of tampering or modification of road speed limiting device:
 - a bus with a GVM over 14.5 tonnes that was built after 1987
 - a prime mover with a GVM over 15 tonnes that was built after 1987

✎ Rejection reason (o) does not apply to:

- an ambulance, police vehicle or Australian Defence Force vehicle; or
 - a vehicle built or permanently modified for fire fighting or emergency rescue purposes, or
 - a bus fitted with hand grips or similar equipment for standing passengers to hold, or
 - a two-axle prime mover if it was built after 1987 but before July 1991, and its operator is a person who uses it for agriculture, horticulture or other primary production activities, except forestry, fishing and mining.
- q. If a vehicle manufactured after 1 July 1988 is not fitted with an operational speedometer, which indicates vehicle speed only in kilometres per hour
 - r. If a vehicle manufactured after 1 July 1988 but before 1 July 2006 is not fitted with an operational odometer, which indicates distance travelled in 1 kilometre units (or less) from 1 to 999,999 kilometres.

✎ Adjustments or modifications to components of the fuel system have the potential to affect compliance of a vehicle with emission standards. The manufacturer's advice should be sought to ensure the vehicle is kept within prescribed limits. A test to determine compliance with National Diesel Emission Standards may be undertaken in jurisdictions that have the necessary test equipment.

11.4. Check oil leaks

Reasons for rejection

- a. Oil leaks from the engine, gearbox, differential, brake system, power steering or any joint or seal:
 - on to brake friction surfaces, or
 - on to the exhaust system, or
 - on to the road surface.

✎ Not all engines have closed crank case ventilation systems and therefore engine oil misting, similar to shock absorber misting, is considered normal.

11.5. Check fuel tanks and system (non LPG/NG)

Reasons for rejection

- a. Any fuel system shows signs of leaking
- b. Fuel lines are in contact with moving parts or a heat source, are kinked, cracked or not secure
- c. Fuel tanks are not securely mounted, straps, supports, mounting brackets or fasteners are missing, cracked, broken or loose
- d. Fuel filler cap is missing or not suitable for the type of tank
- e. Fuel filler cap seal is damaged or missing.

11.6. Visually inspect fire extinguisher

- a. This section only applies to a vehicle if it is mandatory for the vehicle to carry a fire extinguisher.
- b. Reasons for rejection
- c. Fire extinguisher is not filled, charged or under current inspection
- d. Handles, nozzles or hoses of fire extinguisher are missing or damaged
- e. The extinguisher is not securely mounted in the vehicle
- f. The extinguisher is not securely mounted in a readily accessible location in the vehicle in accordance with Australian Standard AS 2444 *portable fire extinguishers – Selection and location*.

✎ Fire extinguishers can become ineffective even though they appear properly charged. For example, powder type extinguishers subject to vibration can fail due to compacting of the powder.

Section 10 of Australian Standard AS 1851 - 2012 portable fire extinguishers, contains suitable procedures for inspecting and testing fire extinguishers.

AS 2444 portable fire extinguishers – Selection and location outlines the appropriate type, size and location of fire extinguishers for vehicles.