



**COMMONWEALTH OF AUSTRALIA**

AUSTRALIAN DESIGN RULE 17  
FOR  
FUEL SYSTEMS FOR GOODS VEHICLES

As Endorsed by the  
 Australian Transport Advisory Council

The intention of this Australian Design Rule is to specify requirements for liquid fuel systems that will facilitate safe operation and reduce the risk of fire due to fuel spillage during filling operations or as a result of impacts.

The Australian Transport Advisory Council has recommended to Commonwealth, State and Territory Governments that all motor vehicles specified below using liquid fuel shall comply with Australian Design Rule 17 - Fuel Systems for Goods Vehicles.

VEHICLE CATEGORY	RULE		AMENDMENT
	MANUFACTURED ON OR AFTER		
	17		
Passenger Cars			
Forward Control Passenger Vehicles up to 8 seats	N/A		
9 seats	N/A		
Other Passenger Cars	N/A		
Passenger Car Derivatives	N/A		
Multi-Purpose Passenger Cars	N/A		
Omnibuses up to 3.5 tonnes GVM			
up to 12 seats	N/A		
over 12 seats	N/A		
up to 4.5 tonnes GVM	N/A		
over 4.5 tonnes GVM	N/A		
Motorcycles	N/A		
Mopeds	N/A		
Specially Constructed Vehicles	N/A		
Other Vehicles not listed above			
up to 4.5 tonnes GVM	N/A		
over 4.5 tonnes GVM	1 July 1975		

N/A - Not Applicable  
 GROSS VEHICLE MASS - Abbreviated to 'GVM'

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 AUSTRALIA

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## AUSTRALIAN DESIGN RULE NO. 17 - FUEL SYSTEMS FOR GOODS VEHICLES

17.1 Definitions

- 17.1.1 Liquid Fuel - A fuel which is liquid at a temperature of 00C and pressure of 1 bar.
- 17.1.2 Fuel System - Any component of the motor vehicle which is exposed to liquid fuel.
- 17.1.3 Fuel Tank - Any single tank on the motor vehicle for storing liquid fuel to be used by the power unit of the motor vehicle. It includes any fittings which are integral with the storage unit but excludes components designed for removal by hand or by the use of tools.
- 17.1.4 Filled Tank - The fuel tank when filled to the point of overflow.
- 17.1.5 Side Mounted Tank - A fuel tank which has at least one part that is not protected by either the cabin or the longitudinal chassis side rails. For the purposes of this Clause a part of the tank shall be considered to be protected by the cabin if it is within the boundaries of the cabin when viewed both in plan and side elevation and to be protected by the side rails if it is within the boundaries of the side rails when viewed in plan.

17.2 Vehicle Attitude

- 17.2.1 For the purpose of this Design Rule the vehicle shall be considered to be on a horizontal surface (except for Clause 17.3.3.2) and loaded to gross vehicle weight in such a way that no axle carries more than its design capacity. \*

17.3 Location Requirements

- 17.3.1 No part of the fuel system shall constitute the widest part of the vehicle. Rear vision mirrors and side mounted lights shall be ignored in determining the points of maximum width of the vehicle.
- 17.3.2 No part of the fuel tank shall be forward of the vertical transverse plane crossing through the centre line of the front wheels.
- 17.3.3 Ground clearance of the fuel system shall satisfy the following requirements:
- 17.3.3.1 The vertical distance from the lowest point of any part of the fuel system to a horizontal surface on which the vehicle is standing shall be not less than the following: \*
- (a) for parts of the fuel system which are closer than 1 m to any axle, measured in a longitudinal plane parallel to the vehicle axis - 100mm.

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- (b) for parts of the fuel system which are midway between any two consecutive axles and not included in (a) - the dimension in millimetres obtained by multiplying the distance between the two consecutive axles in metres by 33.33

17.3.3.2 Sufficient ground clearances shall be provided for all parts of the fuel system such that when the wheels of any axle are on one plane and the wheels of the next consecutive axle are on another plane which intersects the first such that the angle between them is  $70^{\circ} 38'$ , all parts of the fuel system will pass over an apex formed by the intersection without contacting it.

17.3.4 No part of the fuel tank or the filler pipe shall be located within or above the vehicle cabin unless separated by a metal or other approved fire resistant barrier designed to prevent any leakage from entering the driver's cabin or any other enclosed passenger or goods area.

#### 17.4 Design Requirements

17.4.1 The design of the fuel system shall not provide for gravity or self-sustaining feed to the carburettor or injector.

17.4.2 The device for controlling the flow of fuel from or between fuel tanks shall be either within reach of the driver from his normal seating position or outside the driver's cabin.

17.4.3 In the case of vehicles powered with compression ignition engines a device shall be provided which controls the flow of fuel to the engine. The device shall have a stable OFF position and require a positive manual action to adjust it to the ON position.

17.4.4 The filler pipe shall be designed and protected in such a way that overflow from a filling operation would be prevented from spilling on any part of the exhaust or electrical system except a fuel lever indicator assembly.

17.4.5 The fuel tank system shall be so designed that when the tank(s) have been filled there is provision for 5% expansion of the fuel without spillage.

17.4.6 At least one safety vent shall be provided in that part of the fuel tank system which is above the level of the fuel when the tank system has been filled in accordance with Clause 17.1.4.

17.4.7 No safety vent shall discharge into an enclosed compartment.

17.4.8 Except in the case of a diesel fuel system, the fuel withdrawal line shall enter the tank either at a point above the level of the fuel when the tank has been filled in accordance with Clause 17.1.4 or at a point on the inboard side of the tank.

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17.4.9 No fuel tank drain fittings shall extend by more than 20mm beyond the surface of the tank on which they are fitted, or a plane tangential to at least three points on the fuel tank which are located within 75mm of the centreline of the fittings.

17.5 Performance Requirements

17.5.1 Each fuel tank shall be capable of being filled at the following rate without spillage from the tank:

(a) 45 litres per minute in the case of tanks used for the storage of petrol

(b) 66 litres per minute in the case of all other tanks

17.5.2 The rate of total leakage from a fuel tank and fitting shall not exceed 30 grams per minute when the tank, filled with normal fuel, is inverted for five minutes relative to its installed position in the vehicle. For the purpose of a test, the fuel outlet pipe connection shall be plugged.

17.5.3 Each fuel tank shall be equipped with a safety vent of area not less than that derived from the following formula for diameter

$$d = \sqrt{\frac{1047 S_w}{0.145P+14.7}} \times \frac{0.145P + 448}{131} \text{ mm}$$

Where  $S_w$  = maximum surface area of the tank expressed in m<sup>2</sup> below liquid fuel level when the tank has been filled in accordance with Clause 17.1.4.

$P$  = pressure expressed in kPa at which the safety vent is fully open, provided that in the case of safety vents designed to fuse, the value of  $P$  shall not be less than the vapour pressure of the fuel relative to the temperature at which the vent fuses.

17.5.4 The fuel tank shall be capable of withstanding an internal pressure equal to 150% of the value of  $P$  used in Clause 17.5.3.

17.5.5 The rate of total leakage from a side mounted fuel tank shall not exceed 30 grams per minute in a period of 5 minutes after impact testing in accordance with the requirements of Clause 17.6.

17.6 Impact Testing of Side Mounted Fuel Tanks

17.6.1 Preparation

(a) A new fuel tank shall be used for each impact test;

(b) Openings other than the filler pipes shall be plugged;

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(c) The fuel tank shall be filled with water to a level when the total weight of the tank is at least equal to the weight of the tank when filled with normal fuel;

(d) The filler pipe shall then be plugged.

17.6.2 Corner Test - This test is required only in cases where a corner of the fuel tank is in an area which would cause the fuel tank to be defined as a side mounted fuel tank. For the purposes of this Clause a corner shall be considered to be the intersection of edges in the case of a rectangular tank or any point on the circular seam of a cylindrical tank.

(a) Select the corner to be tested as being the one exposed when the fuel tank is in its position on the vehicle;

(b) Position the tank so that the impact point is vertically below the centre of gravity of the fuel tank;

(c) Allow the tank to fall freely through a height of not less than 9m onto an unyielding surface. For the purpose of this Clause a steel plate 9mm in thickness supported on a concrete surface will be regarded as an unyielding surface.

17.6.3 Filler Pipe Test - This test is required only in cases where the extremity of the filler pipe portion of the fuel tank is in an area which would cause the fuel tank to be defined as a side mounted fuel tank.

(a) Position the test tank so that the filler pipe closure is vertically below the centre of gravity of the tank;

(b) Allow the tank to fall freely through a height of not less than 3m onto the surface specified in Clause 17.6.2.