

SCHEDULE-III
(See rules 63 and 77)

Design and Construction of Tank Vehicles for Transporting Petroleum in Bulk

1. Basic design of tank vehicle:

- (1) Tank vehicles for the transportation of petroleum in bulk shall be designed and constructed according to sound engineering practice to ensure correct structural relationship between the tank the propulsion equipment and supporting members, ruggedness, safe-road performance and breaking power.
- (2) In the case of an articulated vehicle, the weight at the ground of the carrying axles of the tank shall not exceed 60 per cent of the designed gross laden weight.
- (3) The maximum width of any tank shall be less than the overall width of the vehicle on which it is mounted or by which it is being towed.

2. Material construction of tank:

- (1) The tank shall be constructed of iron or steel having the following physical requirements and thickness of metal or of any other material approved by the Chief Controller.
 - (a) Physical requirements:

Yield point, minimum	1700 kg/cm ²
Ultimate strength minimum	3100 kg/cm ²
Minimum elongation on a standard 5 cm g gauge length.	20 per cent

B. Thickness of metal:

- (a) Minimum thickness of tank ends, partitions, baffles and stiffeners shall not be less than 2 mm for having volume capacity up to 21 liters per centimeter of 2.7 mm for tanks having volume capacity exceeding 21 liters per centimeters:

Provided that the thickness of tank ends shall in no case be less than the thickness of the tank as specified in clause (b).
- (b) The thickness of the tank shell shall be related to the volume capacity of the tank expressed in liters per centimeter and the distance between partitions, baffles or other stiffeners as well as to the radius of shell curvature as specified in the table below:

1	2	Distance between attachment of partition, baffle and stiffeners		
		Up to 90 cm	Above 90 cm up to 135 cm	Above 135 cm
		3		
----- I. Minimum thickness for tanks having shell radius up to 175 cm and volume capacity -				
(i)	up to 21 litres per centimeter	2.0 mm	2.0 mm	2.0 mm
(ii)	above 21 up to 27 litres per centimeter	2.0 mm	2.5 mm	2.5 mm
(iii)	above 27 litres per centimeter	2.5 mm	2.5 mm	2.5 mm
II. Minimum thickness for tanks having shell radius exceeding 175 cm but not exceeding 225 cm and volume capacity -				
(i)	up to 21 litres per centimeter	2.0 mm	2.0 mm	2.5 mm
(ii)	above 21 up to 27 litres per centimeter	2.5 mm	2.5 mm	2.5 mm
(iii)	above 27 litres per centimeter	2.5 mm	2.5 mm	3.5 mm
III. Minimum thickness for tanks having shell radius exceeding 225 cm and volume capacity -				
(i)	up to 21 litres per centimeter	2.5 mm	2.5 mm	2.5 mm
(ii)	above 21 up to 27 litres per centimeter	2.5 mm	2.5 mm	2.5 mm
(iii)	above 27 litres per centimeter	2.5 mm	3.5 mm	3.5 mm
IV. Minimum thickness for tanks having shell radius up to 310 cm and volume capacity -				
(i)	up to 21 litres per centimeter	2.5 mm	3.5 mm	3.5 mm
(ii)	above 21 up to 27 litres per centimeter	3.5 mm	3.5 mm	3.5 mm
(iii)	above 27 litres per centimeter	3.5 mm	3.5 mm	3.5 mm

Note.- If the tank has other than circular cross-section, the radius for the purpose of this table shall be the maximum for that portion of the cross-section under consideration.

3. Joints:

All joints to tank, its shell, heads, partitions, baffles and stiffeners shall be welded in accordance with recognized good practice and the efficiency of any joint shall not be less than 8.5 per cent of the adjacent metal so joined.

4. Division of tank into compartment:

- (1) Unless expressly permitted in writing by the Chief Controller, a tank having a net capacity exceeding 5 kilolitres shall be divided into compartments by oil-tight partitions and no compartment shall have net capacity exceeding 5 kilolitres.
- (2) Every partition shall be either dished, corrugated, reinforced or rolled. Flat partition without reinforcement shall not be allowed.

5. Testing of tank:

- (1) Every compartment of a tank shall be tested by a responsible competent person by hydrostatic pressure of not less than 0.316 kg/cm². The pressure shall be maintained for a period of not less than one hour and shall be gauged at the top of the compartment. The compartment under test shall not show any leakage or drop of pressure during the test.
- (2) Two adjoining compartments of a tank shall not be tested or filled with water simultaneously.

6. Anchoring of tank:

- (1) The tank shall be securely anchored to the vehicle in a manner that will not –
 - (i) introduce undue concentration of stresses;
 - (ii) impair the stability and performance of the vehicle; and
 - (iii) allow any movement between the tank and the vehicle due to starting; stopping and turning.
- (2) All stops and anchors used to anchor a tank to the vehicle shall be so installed as to be readily accessible for inspection and maintenance.

7. Discharge faucet:

Each compartment of a tank shall be fitted with a discharge faucet which shall be substantially made and so attached. The discharge end of the faucet shall be threaded or so designed as to permit the hose being tightly coupled to it.

8. Emergency discharge control:

- (1) The outlet of each compartment of tank shall have an efficient and reliable shut-off valve located inside the shell or in a sump forming an integral part of the shell.
- (2) The operating mechanism for the shut-off valve shall be provided with a secondary control in an easily accessible position but remote from all fill openings and discharge faucets.
- (3) The secondary control required by sub-paragraph (2) shall be provided with a fusible section which will permit the shut-off valves to close automatically in the event of, a fire.
- (4) A shear section which will break under strain shall be provided between the internal shut-off valve and the discharge faucet. The shear section shall be located as close as possible to the internal shut-off valve.

9. Normal venting:

- (1) Every compartment shall be fitted with an independent vacuum and pressure operated vent with a minimum effective opening being covered with two layers of non corroding metal wire guage having not less than 11 meshes per centmetres.
- (2) The vent shall be so arranged as to limit the pressure within the compartment to 0.21 kg/cm² and the vacuum to 5 centimetres water gauge.

10. Emergency venting for fire exposure:

- (1) In addition to normal venting required by para 9, every compartment of a tank shall be fitted with an emergency venting facility which shall be of the fusible type so as to provide a minimum fire-venting-opening having a net area in square centimeters equal to 8 plus 4.3 times the gross capacity of the compartment in kilolitres.
- (2) The emergency vent shall be so designed as to prevent loss of liquid through the vent in the case of vehicle upset except in the case of pressure rise when in the upset position
- (3) Fusible vents shall be actuated by elements which will operate at a temperature not exceeding 93 DC.

11. Top-filling pipe:

- (1) The inner end of the filling pipe shall be fitted with a proper type of splash deflector and the outer end threaded or so designed as to ensure leak proof connection with the filling hose.
- (2) Top filling pipe, if provided, shall be carried down nearly to the bottom of the tank.
- (3) The outer end of the filling pipe shall be fitted with an oil-tight locker cap.

12. Tank-gauging arrangements:

- (1) Each compartment shall be fitted with a dip pipe or any approved tank gauging device.
- (2) The dip pipe, if provided, shall be carried upto the bottom of the tank and all openings in the dip pipe, except the capped top opening shall be covered with two layers of wire gauges having not less then 11 meshes per cm.
- (3) The dip pipe shall be fitted with an oil tight licker cap.

13. Tank overturn protection:

- (1) All tank top fittings shall be protected from damage in the event of overturning of the vehicle chassis on which it is mounted.
- (2) Where protection to tank top fitting are provided by enclosing them within the contour of the shell or within a rigid coming welded to the tank shell, the area enclosed by such protection shall be adequately drained and provided with plug or cut-outs to enable the section to be gas-freed completely before repair.

14. Marketing:

Every tank vehicle used for the transportation of petroleum shall, whether loaded or empty be conspicuously marked on each side and rear thereof in letters at least 7 cm high on a background of sharply contrasting colours with the words "**FLAMMABLE**" and the common name of the flammable liquid being transported. e.g. "**MOTOR SPIRIT**", "**KEROSENE**", etc.