Chapter 6.8

Provisions for road tank vehicles and road gas elements vehicles

6.8.1 General

6.8.1.1 Tank and elements support frameworks, fitting and tie-down attachments*

6.8.1.1.1 Road tank vehicles and road gas elements vehicles shall be designed and manufactured with supports to provide a secure base during transport and with suitable tie-down attachments. The tie-down attachments shall be located on the tank or elements support, or vehicle structure in such a manner that the suspension system is not left in free play.

6.8.1.1.2 Tanks shall be carried only on vehicles whose fastenings are capable, in conditions of maximum permissible loading of the tanks, of absorbing the forces specified in 6.7.2.2.12, 6.7.3.2.9 and 6.7.4.2.12.

6.8.2 Road tank vehicles for long international voyages for substances of classes 3 to 9

6.8.2.1 Design and construction

6.8.2.1.1 A road tank vehicle for long international voyages shall be fitted with a tank complying with the provisions of chapters 4.2 and 6.7 and shall comply with the relevant provisions for tank supports, frameworks, lifting and tie-down attachments,* except for the provisions for forklift pockets, and in addition comply with the provisions of 6.8.1.1.1.

6.8.2.2 Approval, testing and marking

6.8.2.2.1 For approval, testing and marking of the tank, see 6.7.2.

6.8.2.2.2 The tank supports and tie-down attachments* of vehicles for long international voyages shall be included in the visual external inspection provided for in 6.7.2.19.

6.8.2.2.3 The vehicle of a road tank vehicle shall be tested and inspected in accordance with the road transport provisions of the competent authority of the country in which the vehicle is operated.

6.8.3 Road tank vehicles and road gas elements vehicles for short international voyages

6.8.3.1 Road tank vehicles for substances of classes 3 to 9 (IMO type 4)

6.8.3.1.1 *General provisions*

6.8.3.1.1.1 An IMO type 4 tank shall comply with either:

.1 the provisions of 6.8.2; or

.2 the provisions of 6.8.3.1.2 and 6.8.3.1.3.

6.8.3.1.2 *Design and construction*

6.8.3.1.2.1 An IMO type 4 tank shall comply with the provisions of 6.7.2, with the exception of:

.1 6.7.2.3.2; however, they shall have been subjected to a test pressure not less than that specified according to the appropriate tank instruction assigned to the substance;

* See also IMO Assembly resolution A.581(14) of 20 November 1985, *Guidelines for securing arrangements for the transport of road vehicles on ro-ro ships*, as amended by MSC/Circ.812 and MSC.1/Circ.1355.

.2 6.7.2.4; however, the thickness of cylindrical portions and ends in reference steel shall be:

.1 not more than 2 mm thinner than the thickness specified according to the appropriate tank instruction assigned to the substance;

.2 subject to an absolute minimum thickness of 4 mm of reference steel; and

.3 for other materials, subject to an absolute minimum thickness of 3 mm;

.3 6.7.2.2.13; however, the safety factor shall be not less than 1.3;

.4 6.7.2.2.1 to 6.7.2.2.7; however, the materials of construction shall comply with the provisions of the competent authority for road transport;

.5 6.7.2.5.1; however, the protection of valves and accessories shall comply with the provisions of the competent authority for road transport;

.6 6.7.2.5.3; however, IMO type 4 tanks shall be provided with manholes or other openings in the tank which comply with the provisions of the competent authority for road transport;

.7 6.7.2.5.2 and 6.7.2.5.4; however, tank nozzles and external fittings shall comply with the provisions of the competent authority for road transport;

.8 6.7.2.6; however, IMO type 4 tanks with bottom openings shall not be used for substances for which bottom openings are not permitted in the appropriate tank instruction assigned to the substance. In addition, existing openings and hand inspection holes shall be either closed by bolted flanges mounted both internally and externally, fitted with product-compatible gaskets, or by welding as specified in 6.7.2.6.1. The closing of openings and hand inspection holes shall be approved by the competent authority for sea transport;

.9 6.7.2.7 to 6.7.2.15; however, IMO type 4 tanks shall be fitted with pressure relief devices of the type required according to the appropriate tank instruction assigned to the substance. The devices shall be acceptable to the competent authority for the road transport for the substances to be transported. The start-to-discharge pressure of the spring-loaded pressure relief devices shall in no case be less than the maximum allowable working pressure, nor greater than 25% above that pressure; and

.10 6.7.2.17; however, tank supports on permanently attached IMO type 4 tanks shall comply with the provisions of the competent authority for road transport.

6.8.3.1.2.2 For IMO type 4 tanks, the maximum effective gauge pressure developed by the substances to be transported shall not exceed the maximum allowable working pressure of the tank.

6.8.3.1.3 *Approval, testing and marking*

6.8.3.1.3.1 IMO type 4 tanks shall be approved for road transport by the competent authority.

6.8.3.1.3.2 The competent authority for sea transport shall issue additionally, in respect of an IMO type 4 tank, a certificate attesting compliance with the relevant design, construction and equipment provisions of this subsection and the special provisions for certain substances, as applicable.

6.8.3.1.3.3 IMO type 4 tanks shall be periodically tested and inspected in accordance with the provisions of the competent authority for road transport.

6.8.3.1.3.4 An IMO type 4 tank shall be marked in accordance with 6.7.2.20. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.7.2.20, it will be sufficient to endorse the metal plate attached to the IMO type 4 tank with “IMO 4”.

6.8.3.1.3.5 IMO type 4 tanks which are not permanently attached to the chassis shall be marked “IMO type 4” in letters at least 32 mm high.

6.8.3.2 **Road tank vehicles for non-refrigerated liquefied gases of class 2 (IMO type 6)**

6.8.3.2.1 *General provisions*

6.8.3.2.1.1 An IMO type 6 tank shall comply with either:

.1 the provisions of 6.7.3; or

.2 the provisions of 6.8.3.2.2 and 6.8.3.2.3.

6.8.3.2.1.2 For an IMO type 6 tank, the design temperature range is defined in 6.7.3.1. The temperature to be taken is to be agreed by the competent authority for road transport.

6.8.3.2.2 *Design and construction*

6.8.3.2.2.1 An IMO type 6 tank shall comply with the provisions of 6.7.3, with the exception of:

.1 the safety factor of 1.5 in 6.7.3.2.10; however, the safety factor shall not be less than 1.3;

.2 6.7.3.5.7;

.3 6.7.3.6.1, if bottom openings are approved by the competent authority for sea transport;

.4 6.7.3.7.1; however, the devices shall open at a pressure not less than the MAWP and be fully open at a pressure not exceeding the test pressure of the tank;

.5 6.7.3.8, if the delivery capacity of the pressure relief devices is approved by the competent authorities for sea and road transport;

.6 the location of the pressure relief device inlets in 6.7.3.11.1, which need not be in the longitudinal centre of the shell;

.7 the provisions for forklift pockets; and

.8 6.7.3.13.5.

6.8.3.2.2.2 If the landing legs of an IMO type 6 tank are to be used as support structure, the loads specified in 6.7.3.2.9 shall be taken into account in their design and method of attachment. Any bending stress induced in the shell as a result of this manner of support shall also be included in the design calculations.

6.8.3.2.2.3 Securing arrangements (tie-down attachments) shall be fitted to the tank support structure and the towing vehicle of an IMO type 6 tank. Semi-trailers unaccompanied by a towing vehicle shall be accepted for shipment only if the trailer supports and the securing arrangements and the position of stowage are agreed by the competent authority for sea transport, unless the approved Cargo Securing Manual includes this arrangement.

6.8.3.2.3 *Approval, testing and marking*

6.8.3.2.3.1 IMO type 6 tanks shall be approved for road transport by the competent authority for road transport.

6.8.3.2.3.2 The competent authority for sea transport shall issue additionally, in respect of an IMO type 6 tank, a certificate attesting compliance with the relevant design, construction and equipment provisions of this chapter and, where appropriate, the special provisions for the gases listed in the Dangerous Goods List. The certificate shall list the gases allowed to be transported.

6.8.3.2.3.3 An IMO type 6 tank shall be periodically tested and inspected in accordance with the provisions of the competent authority for road transport.

6.8.3.2.3.4 An IMO type 6 tank shall be marked in accordance with 6.7.3.16. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.7.3.16.1, it will be sufficient to endorse the metal plate attached to the IMO type 6 tank with “IMO 6”.

6.8.3.3 **Road tank vehicles for refrigerated liquefied gases of class 2 (IMO type 8)**

6.8.3.3.1 *General provisions*

6.8.3.3.1.1 An IMO type 8 tank shall comply with either:

.1 the provisions of 6.7.4; or

.2 the provisions of 6.8.3.3.2 and 6.8.3.3.3.

6.8.3.3.1.2 An IMO type 8 tank shall not be offered for transport by sea in a condition that would lead to venting during the voyage under normal conditions of transport.

6.8.3.3.2 *Design and construction*

6.8.3.3.2.1 An IMO type 8 tank shall comply with the provisions of 6.7.4, with the exception:

.1 that aluminium jackets may be used, with the approval of the competent authority for sea transport;

.2 that IMO type 8 tanks may have a shell thickness less than 3 mm, subject to the approval of the competent authority for sea transport;

.3 that for IMO type 8 tanks used for non-flammable refrigerated gases, one of the valves may be replaced by a frangible disc. The frangible disc shall rupture at a nominal pressure equal to the test pressure;

.4 of the provisions of 6.7.4.7.3 for the combined capacity of all pressure relief devices under complete fire-engulfment conditions;

.5 of the safety factor of 1.5 in 6.7.4.2.13; however, the safety factor shall not be less than 1.3;

.6 of 6.7.4.8; and

.7 of the provisions for forklift pockets.

6.8.3.3.2.2 If the landing legs of an IMO type 8 tank are to be used as support structure, the loads agreed as in 6.7.4.2.12 shall be taken into account in their design and method of attachment. Bending stress induced in the shell as a result of this manner of support shall be included in design calculations.

6.8.3.3.2.3 Securing arrangements (tie-down attachments) shall be fitted to the tank support structure and the towing vehicle of an IMO type 8 tank. Semi-trailers unaccompanied by a towing vehicle shall be accepted for shipment only if the trailer supports and the securing arrangements and the position of stowage are agreed by the competent authority for sea transport, unless the approved Cargo Securing Manual includes this arrangement.

6.8.3.3.3 *Approval, testing and marking*

6.8.3.3.3.1 IMO type 8 tanks shall be approved for road transport by the competent authority for road transport.

6.8.3.3.3.2 The competent authority for sea transport shall issue additionally, in respect of an IMO type 8 tank, a certificate attesting compliance with the relevant design, construction and equipment provisions of this subsection and, where appropriate, the special tank type provisions for the gases in the Dangerous Goods List. The certificate shall list the gases allowed to be transported.

6.8.3.3.3.3 IMO type 8 tanks shall be periodically tested and inspected in accordance with the provisions of the competent authority for road transport.

6.8.3.3.3.4 IMO type 8 tanks shall be marked in accordance with 6.7.4.15. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.7.4.15.1, it will be sufficient to endorse the metal plate attached to the IMO type 8 tank with "IMO 8"; the reference to holding time may be omitted.

6.8.3.4 **Road gas elements vehicles for compressed gases of class 2 (IMO Type 9)**

6.8.3.4.1 *General provisions*

6.8.3.4.1.1 An IMO type 9 tank shall comply with the provisions of 6.8.3.4.2 and 6.8.3.4.3.

6.8.3.4.1.2 An IMO type 9 tank shall not be offered for transport by sea in a condition that would lead to venting during the voyage under normal conditions of transport.

6.8.3.4.2 *Design and construction*

6.8.3.4.2.1 An IMO type 9 tank shall comply with the provisions of 6.7.5 with the exception that the horizontal forces at right angles to the direction of travel shall be the MPGM multiplied by the acceleration due to gravity (g);* and that the inspection and testing shall be in accordance with the competent authority where the road gas elements vehicle is approved.

6.8.3.4.2.2 If the landing legs of an IMO type 9 tank are to be used as support structure, the loads specified in 6.7.5.2.8 shall be taken into account in their design and method of attachment. Any bending stress induced in the shell or the elements as a result of this manner of support shall also be included in the design calculations.

6.8.3.4.2.3 Securing arrangements (tie-down attachments) shall be fitted to the road gas elements vehicle support structure and the towing vehicle of an IMO type 9 tank. Semi-trailers unaccompanied by a towing vehicle shall be accepted for shipment only if the trailer supports and the securing arrangements and the position of stowage are agreed by the competent authority for sea transport, unless the approved Cargo Securing Manual includes this arrangement.

6.8.3.4.3 *Approval, testing and marking*

6.8.3.4.3.1 IMO type 9 tanks shall be approved for road transport by the competent authority for road transport.

6.8.3.4.3.2 The competent authority for sea transport shall issue additionally, in respect of an IMO type 9 tank, a certificate attesting compliance with the relevant design, construction and equipment provisions of this chapter and, where appropriate, the special provisions for the gases listed in the Dangerous Goods List. The certificate shall list the gases allowed to be transported.

6.8.3.4.3.3 An IMO type 9 tank shall be periodically tested and inspected in accordance with the provisions of the competent authority for road transport where the road gas elements vehicle is approved.

6.8.3.4.3.4 An IMO type 9 tank shall be marked in accordance with 6.7.5.13, as applicable. However, where the marking required by the competent authority for road transport is substantially in agreement with that of 6.7.5.13.1, it will be sufficient to endorse the metal plate attached to the IMO type 9 tank with "IMO 9".

* For calculation purposes, $g = 9.81\ m/s^2$.