MERCHANT SHIPPING NOTICE

MARINE SAFETY AGENCY

MSN 1705 (M)

Portable Tanks, Road Tank Vehicles and Rail Tank Wagons for the Carriage by Sea of Liquid Dangerous Goods and Liquefied Gases

Notice to operators, shipowners, masters, tank manufacturers, hauliers, freight forwarders and shippers of dangerous goods

This Notice supersedes Merchant Shipping Notice M1437

This Merchant Shipping Notice is an integral part of the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997[1]. It replaces Merchant Shipping Notice M.1437 setting out the requirements for portable tanks, road tank vehicles and rail tank wagons for the carriage by sea of liquid dangerous goods and liquefied gases, in accordance with regulation 1 of these Regulations.

The Annex to this Notice sets out the provisions for portable tanks, road tank vehicles and rail tank wagons to be used for the carriage by sea of liquid dangerous goods and liquefied gases. The information is addressed to those concerned with the design, construction, testing and approval of tanks but it is of equal importance to shippers since it is the responsibility of the shipper under the Regulations to use a container suitable for the carriage of the dangerous substance. The shipowner or master should also be made aware of procedures and standards which will meet the provisions of the Regulations.

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An executive agency of
THE DEPARTMENT OF THE ENVIRONMENT, TRANSPORT AND THE REGIONS

Safe Ships Clean Seas

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ANNEX

PORTABLE TANKS, ROAD TANK VEHICLES AND RAIL TANK WAGONS FOR THE CARRIAGE BY SEA OF LIQUID DANGEROUS GOODS AND LIQUEFIED GASES

CONTENTS

1. INTRODUCTION

1.1 Purpose of Annex

1.1.1 This Annex sets out the provisions for the carriage by sea of dangerous liquids and liquefied gases in portable tanks, road tank vehicles and rail tank wagons.

1.2 Applicability

1.2.1 The information is addressed to those concerned with the design, construction and testing of tanks but it is of equal importance to shippers since it is the responsibility of the shipper under the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997 to use a container suitable for the carriage of dangerous substances. The shipowner or master should also be made aware of procedures and standards which will meet the provisions of the Regulations.

1.3 Portable Tanks and Road Tank Vehicles

1.3.1 Portable tanks and road tank vehicles should be of a standard of design and construction to withstand the forces and actions arising from the contents, loading and unloading and other stresses imposed in normal handling and transport operations at sea.

1.3.2 The International Maritime Organization (IMO) has over a period of years developed provisions for different types of tanks and these are contained in Section 13 of the General Introduction to the International Maritime Dangerous Goods (IMDG) Code (referred to hereafter as "Section 13"). Tanks designed, constructed, tested, marked and certified in accordance with these provisions are acceptable.

1.3.3 All tanks used for the carriage of dangerous liquids and liquefied gases on United Kingdom ships wheresoever they may load or such tanks being loaded or discharged from foreign ships whilst they are within United Kingdom territorial waters should be IMO types approved for the substances being carried.

1.3.4 The Marine Safety Agency has authorised certain inspecting authorities to approve on its behalf tanks which are to be United Kingdom owned or operated and which meet the requirements of the IMDG Code as modified by this Annex. An inspecting authority will approve designs, witness constructional aspects and tests, carry out the necessary inspections and re-inspections and issue the appropriate certificates.

1.3.5 The inspecting authorities authorised by the Marine Safety Agency for the purpose of this Annex are –

ABS Worldwide Technical Services Inc
Ajax Technical Services
American Bureau of Shipping
Bureau Veritas
British Engine Insurance Ltd
British Inspecting Engineers Ltd
Cornhill Insurance Ltd
Det Norske VerItas
Eagle Star Insurance Co Ltd
Guardian Royal Exchange Assurance Ltd
Inspection Quality Ltd
Lloyds Register Industrial Services
National Vulcan Engineering Insurance Group Ltd
Plant Safety Limited
SGS United Kingdom Ltd

1.3.6 United Kingdom owned/operated tanks should be certificated for the substances to be carried plated and marked in accordance with the provisions of Section 13, where lists of substances together with appropriate tank data are appended to the various subsections.

1.3.7 Details of new substances or any mixture not listed or adequately covered already within Section 13 should be forwarded to the Marine Safety Agency so that a suitable tank standard can be agreed and a proposal for an inclusion 1n the Code made to IMO.

1.3.8 Application for the certification of portable tanks and road tank vehicles which are to be United Kingdom owned or operated should be made directly to the Inspecting authority concerned accompanied by such detail as the inspecting authority requires.

1.3.9 The IMDG Code allows for the development and use of alternative arrangements. Where such arrangements are proposed and the inspecting authority is satisfied they offer at least equivalent safety in use, the proposals should be submitted to the Marine Safety Agency for consideration.

1.4 IMDG Code Provisions

1.4.1 The IMDG Code contains provisions for certain tanks described generally as follows –

Types 1 and 2
Portable tanks or road tank vehicles for liquids.

Type 5
Portable tank for low pressure liquefiable gases.

Type 7
Portable tank for refrigerated gases.

Types 4, 6 and 8
Road tank vehicles for dangerous liquids, low pressure liquefiable gases and refrigerated gases respectively carried on short international voyages.

1.5 United Kingdom Approved Standards

1.5.1 Traditionally the United Kingdom has recognised that certain standards other than those referred to in the IMDG Code (e.g. reference temperatures for liquids and gases, shell thickness for high corrosives) can be safely applied when considering carriage to certain geographical areas or on voyages of limited duration.

1.6 Existing Tanks

1.6.1 Type 1 and Type 5 tanks for liquids and low pressure liquefied gases respectively, constructed and certified on behalf of the Marine Safety Agency prior to 1st July 1988 in accordance with the above tradition may continue in use under the conditions specified in the certificate provided that -

.1 it is understood that the responsibility for ascertaining that the tank and its contents will be acceptable in the country of destination lies solely with the consignor; and

.2 a suitable endorsement is included on the certificate against a substance, specifying the nature of the restricted trade.

With respect to subparagraph (a) above carriers should care that they are not faced with the problems of which cannot be landed or which cause the vessel to be delayed.

2. PROVISIONS RELATING TO TANK DESIGN

2.1 Reference Temperatures

2.1.1 As stated in paragraph 5, traditionally the Marine Safety Agency has authorised the use of various reference temperatures to be used for design and filling purposes depending upon the zone of operation of the tank. The IMDG Code provisions, which are generally based on world-wide shipment, do not permit this. The design of all United Kingdom owned/operator portable tanks constructed on or after 1st July 1988 is subject to the reference temperature requirements of Section 13.

2.1.2 A road tank vehicle intended for the carriage of low pressure liquefiable gases on short international voyages (Type 6 tank) is acceptable for voyages to and from Europe if designed and constructed for the reference temperatures envisaged in the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) for such tanks.

2.1.3 A road tank vehicle fitted with an appropriate pressure relief valve and tie-down arrangements and designed In accordance with BS 7122; 1989 may be carried on voyages within the United Kingdom coastal climatic area, which is defined as the United Kingdom and Irish Republic coastal waters, Irish Sea, North Channel and St George's Channel.

2.1.4 It should be noted that the IMDG Code at paragraph 13.102.11 addresses Type 5 tanks which are fully insulated and a reference temperature of 50°C is "envisaged". Where it is intended to design to these provisions, details of the insulation system to be used and the means of securing it to the shell should be submitted to the Marine Safety Agency for consideration.

3. MATERIALS OF CONSTRUCTION

3.1 Use of Aluminium

3.1.1 The use of aluminium although provided for in Section 13 is not normally regarded as suitable for sea transport. Where its use is considered essential for product purity or compatibility reasons, a suitable thermal insulation system should be provided and details should be submitted to the Marine Safety Agency for consideration.

3.2 Tank Supports and Framework

3.2.1 Unless constructed of corrosion resistant material, no structural member of a tank support or frame take work should be less than 3.2 mm in thickness, and no main load bearing member of such a structure less than 5 mm thickness. Any proposal to the inspecting authority to reduce member thicknesses below these minima should be supported by detailed calculations showing that the provisions of paragraph 3(a) above are satisfied, taking into account a minimum corrosion allowance of 1.5 mm. In designs using tubular or closed box section members the corrosion allowance may be reduced to 0.75 mm, providing that the ends of such members are effectively closed by continuous welding.

3.3 Siting, Setting and Sizing of Relief Devices

3.3.1 The position of pressure relief devices and their inlets should be in accordance with Section 13.

3.3.2 For the purposes of paragraph 13.207.4 of the Code, in determining total relieving capacity of pressure relief devices fitted to portable tanks, the formula given in paragraph 13 109.1.1. should be used; however the value of F in that formula should in no case be less than 0.167.

3.3.3 The capacity of relief devices fitted to road tank vehicles intended for gases (Types 6 and 8 tanks) being carried within Europe should conform to the provisions of the European Road Agreement on the Carriage of Dangerous Goods (ADR) and additionally:

(1) the devices should be set to be fully open at a pressure not exceeding the test pressure;

(2) it should be noted that in the case of flammable or toxic refrigerated liquefied gases the use of frangible discs is not acceptable.

3.3.4 Outlets from pressure relief devices should not in anyway be so enclosed as to restrict the full venting capacity of the valves being achieved.

3.4 Inspection Openings

3.4.1 Openings in shells provided for inspection purposes where recommended by Section 13 should be designed in accordance with the relevant pressure vessel code (BS 470: 1984 also refers). Manhole covers for Types 1, 2 and 4 should have as a minimum six point fastenings.

3.5 Testing and Inspection Aspects

3.5.1 Where portable tanks are to be considered as containers under the International Convention for Safe Containers (CSC), prototype testing should be carried out in accordance with the requirements of BS ISO 1496-3:1995.

3.5.2 Framed tanks which are not intended to be stacked in operation should be provided with positive structural arrangements to prevent inadvertent stacking unless the relevant prototype test has been carried out.

3.5.3 When lifting devices consisting of lugs welded to doubling plates or similar arrangements are provided the appropriate overload lifting test should be carried out on each tank.

3.5.4 Leakage testing may be carried out at 90 per cent of the maximum allowable working pressure of the tank, notwithstanding the provisions of Section 13.

3.5.5 The internal examination of a tank required at the 2½-year intermediate inspection may be waived in the case of a tank dedicated to the carriage of one substance or a generic group of substances where history has shown that the substances have had no deleterious effects on the material of the tank shell and welds. Where such an exemption is claimed details of the dedicated substance and satisfactory history should be forwarded to the Marine Safety Agency.

3.6 Road Tank Vehicles

3.6.1 Road tank vehicles should be certified and plated as Type 4, 6 or 8 tanks as appropriate, in accordance with the requirements of Section 13. The carrying tank of a road tank vehicle should be certified for the carriage of its substance internationally by road and the vehicles should be similarly approved.

4. PROVISIONS FOR CERTAIN CLASSES AND SUBSTANCES

4.1 Class 2: Gases

4.1.1 It should be noted that paragraph 13.203.12 of the IMDG Code recommends that the static weight of the tank and contents be taken into account when designing for the dynamic condition.

4.1.2 Existing tanks for refrigerated gases (Type 7) which have been accepted for use under a letter of acceptance or otherwise by the Marine Safety Agency may be issued with certificates and plated as Type 7 tanks. However, the certificate should be endorsed as required by paragraph 13.201.3 of the IMDG Code where such tanks do not fully meet the requirements of sub-section 13.200 of the Code.

4.2 Hydrogen Peroxide (Class 5.1)

4.2.1 Pressure relief arrangements for the substance should be submitted to the Department for approval.

4.3 Organic Peroxides (Class 5.2)

4.3.1 Section 13.1.55 of the IMDG Code includes special provisions relating to tank design, and a number of organic peroxide entries, together with basic tank data, are included in the list of substances.

4.3.2 In all instances where carriage by sea in portable tanks or road tank vehicles is proposed for organic peroxides reference should be made to the Marine Safety Agency. It will be necessary to provide sufficient detail to satisfy the requirements of Section 13.1.55 of the IMDG Code.

4.4 Poisonous Substances (Class 6-1)

4.4.1 Many substances of this Class need to be carried in tanks fitted with pressure relief devices specified as "NF" in column 7 in the list of substances appended to Section 13.1, indicating the measures which should be taken to prevent vapour leakage. Such tanks should therefore be designed to withstand the external pressure recommended in the Code, without a vacuum valve.

4.5 Corrosive Substances (Class 8)

4.5.1 In considering the effect of leakage from a damaged tank shell or valved outlet, the IMDG Code recommends an increased minimum shell thickness and a top discharge for substances. which are highly corrosive to mild steel, that is the ship's structure. An 8 mm mild steel shell is required (or an equivalent thickness in other metal), and since it is an IMDG Code requirement that the tank material must be substantially immune to its contents, or passivated or lined, the increased thickness is intended solely to provide greater resistance to external impact and damage. Traditionally, the United Kingdom has regarded corrosive damage as time dependent, and substances which are highly corrosive to mild steel have been permitted in suitable Type 1 minimum thickness tanks with bottom outlets, on voyages within the area:

bounded by a line from a point on the Norwegian coast in latitude 62° *North to a point* 62° *North 02° West; thence to a point* 58° *North 10° West; thence to a point* 51° *North* 12° *West; thence to Brest; but excluding all waters which lie to the northward and eastward of a line between Kalmar on the east coast of Sweden and a point on the west coast of Gland in latitude* 56° *40' North and from the southern tip of Gland to Gdansk.*

4.5.2 The practice of certifying minimum thickness Type 1 tanks with B type (three closures) bottom outlets may continue. However:

(1) it is the responsibility of the consignor/shipper to ensure that the tank and contents will be accepted at the destination; and

(2) the certificate should be suitably endorsed against the product, indicating the nature of the trading restriction.

5. OPERATING REQUIREMENTS

5.1 Overstowage Below Deck

5.1.1 Portable tanks should not be overstowed below deck, unless secured by proper stowage within the guides of a cellular container ship.

5.2 Overstowage on Deck

5.2.1 Portable tanks should not be overstowed on deck unless enclosed in a framework meeting at least the requirements of the International Organization for Standardisation (ISO) and the International Convention for Safe Containers (CSC). The stowage and securing arrangements should ensure that the tank, its framework, and the securing devices are not likely to be subjected to strains in excess of those for which they are designed.

5.3 Ullage

5.3.1 Portable tanks should not be accepted for shipment in an ullage condition liable to produce an unacceptable hydraulic force due to surge within the tank. In general, where an ullage condition of 30 per cent is to be exceeded, the forces to be sustained should be ascertained at the design stage.

5.3.2 Notwithstanding the foregoing, shippers should be aware that other modes of transport have different requirements concerning ullage conditions.

5.4 Semi-trailers

5.4.1 A semi-trailer without a tractor unit should not be accepted for shipment unless it can be safely supported and secured. The support and securing arrangements provided should take into account the direction and magnitude of the dynamic forces provided for in Section 13.

5.5 Holding Times

5.5.1 Portable tanks and road tank vehicles for refrigerated gases should not be offered for shipment where the duration of the voyage will exceed the holding time. Holding times should be established by test or prior use of the tank before sea carriage is undertaken. A tank offered for shipment should be in such a condition that pressure relief of the contents will not take place as a result of normal heat leak whilst the tank is on board ship.

5.6 Stowage for Refrigerated Gases

5.6.1 A tank containing a refrigerated gas should be so stowed that any discharge occurring from a relief device would not impinge upon the ship's structure.