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## The Merchant Shipping (Fire Protection) Regulations 1998: Special fire safety measures for ships carrying dangerous goods

Notice to Shipowners, Shipbuilders, Masters, Certifying Authorities and Surveyors

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### *Summary*

This Notice advises all Shipowners, Shipbuilders, Masters, Certifying Authorities and Surveyors of the new 1998 Fire Protection Regulations for special fire safety measures for ships carrying dangerous goods.

#### Key Points:-

- This Notice forms an integral part of the Merchant Shipping (Fire Protection: Large Ships) Regulations 1998 and the Merchant Shipping (Fire Protection: Small Ships) Regulations 1998.
- Schedules contained in this Notice are invoked by those Regulations and are therefore a statutory obligation.

In this Merchant Shipping Notice the following expressions have the following meanings -

“A” Class Division” means a bulkhead or part of a deck which is -

- (a) constructed of steel or other equivalent material;
- (b) suitably stiffened;
- (c) so constructed as to be capable of preventing the passage of smoke and flame to the end of the 60 minute standard fire test; and
- (d) so insulated where necessary with suitable non-combustible materials that if the division is exposed to a standard fire test the average temperature on the unexposed side of the division shall not increase more than 139°C above the initial temperature nor shall the temperature at any point, including any joint, rise more than 180°C above the initial temperature within the time listed below -

“A-60” standard, 60 minutes;

“A-30” standard, 30 minutes;

“A-15” standard, 15 minutes;

“A-0” standard, 0 minutes;

“cargo spaces” are all spaces used for cargo including cargo oil tanks, slop tanks and trunks to such spaces;

“closed ro-ro cargo space” means a ro-ro cargo space which is not an open ro-ro cargo space which is not a weather deck;

“dangerous goods” means goods as defined in the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations (a);

“machinery spaces of Category A” means a machinery space which contains -

- (a) internal combustion type machinery used either for main propulsion purposes, or for other purposes where such machinery has in the aggregate a total power output of not less than 375 kilowatts, or
- (b) any oil-fired boiler or oil-fired unit; and any trunk to such a space;

“open ro-ro spaces” are ro-ro cargo spaces which are open at both ends, or open at one end and provided with adequate natural ventilation effective over the entire length through permanent openings in the side plating or deck head;

“ro-ro cargo spaces” means spaces not normally subdivided in any way and extending to either a substantial length or the entire length of the ship in which goods (packaged or in bulk), in or on rail or road cars, vehicles (including road or rail tankers), trallers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles can be loaded and unloaded normally in a horizontal direction;

“special category space” means any enclosed space above or below the bulkhead deck intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, into and from which such vehicles can be driven and to which passengers have access;

“weather deck” means a deck completely exposed to the weather from above and at least two sides.

1. The special protective requirements for passenger ships and for cargo ships of 500 tons or over carrying dangerous goods on international voyages shall be determined by reference to Tables 1, 2 and 3.
2. In Table 1, ships and cargo spaces are divided into categories A-E as set out below -
  - (A) ships and cargo spaces not specifically designed for the carriage of freight containers but intended for the carriage of dangerous goods in package form including goods in freight containers and portable tanks;
  - (B) purpose built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;
  - (C) spaces intended for the carriage of dangerous goods which are -
    - (i) closed ro-ro cargo spaces;
    - (ii) open ro-ro cargo spaces; or
    - (iii) ro-ro cargo spaces on the weather deck;
  - (D) ships and cargo spaces intended for the carriage of solid dangerous goods in bulk;
  - (E) ships and cargo spaces intended for the carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

Such categories are listed in the top horizontal row of Table 1.

3. In Tables I, 2 and 3 the protective measures to be applied have the description set out below -

- (a) arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by a permanent pressurization of the firemain or by suitably placed remote starting arrangements for the fire pumps;
- (b) the quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures specified in the Regulations, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Secretary of State;
- (c) means of effectively cooling the designated under deck cargo space by copious quantities of water, either by a fixed pressure water spraying system complying with Schedule 3 in Merchant Shipping Notice MSN 1666 (M) or flooding the cargo space with water, shall be provided. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces. The drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account as necessary in calculating stability;
- (d) provision to flood a designated under deck cargo space with suitable specified media may be substituted for the requirements in subparagraph (c) of this paragraph;
- (e) electrical equipment and wiring where permitted for such spaces shall be in accordance with the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or to the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1997, whichever is appropriate;
- (f) closed ro-ro cargo spaces and special category spaces shall be fitted with a fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 5 of Merchant Shipping Notice MSN 1666 (M). All other types of cargo spaces shall be fitted with either such a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of Schedule 6 in Merchant Shipping Notice MSN 1666 (M). If a sample extraction smoke detection system is fitted, particular attention shall be paid to paragraph I(k) of Schedule 6 in Merchant Shipping Notice MSN 1666 (M) in order to prevent the leakage of toxic fumes into occupied areas;
- (g) adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space based on an empty cargo space and for removal of vapours from the upper or lower parts of the cargo space, as appropriate;
- (h) the fans shall be such as to avoid the possibility of ignition of flammable gas air mixture. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;
- (i) where flammable or toxic liquids are to be carried in enclosed cargo spaces, the bilge pumping arrangements shall be to the requirements of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984, whichever is appropriate;
- (j) four sets of full protective clothing resistant to chemical attack shall be provided in addition to the firemen's outfits required by the Regulations. Protective clothing shall cover all skin so that no part of the body is unprotected;
- (k) at least two sets of self-contained breathing apparatus shall be provided in addition to the breathing apparatus otherwise required by the Regulations;

- (l) at least three portable fire extinguishers of the dry powder type or equivalent complying with Schedule 8 of Merchant Shipping Notice MSN 1665 (M) shall be provided for each cargo space. These extinguishers shall be in addition to any portable fire extinguishers required by the Regulations;
- (m) bulkheads forming boundaries between cargo spaces and machinery spaces of Category A shall be insulated to "A-60" standard unless the dangerous goods are stowed at least 3 metres horizontally away from such bulkheads. Boundaries other than bulkheads between such spaces shall be insulated to "A-60" standard. Dangerous goods of Class 1 shall be stowed 3 metres horizontally away from machinery space bulkheads in all cases and the common bulkheads shall be insulated to "A-60" standard;
- (n) each special category space, each open ro-ro cargo space having a deck over and each space deemed to be a closed ro-ro cargo space not capable of being sealed shall be fitted with a fixed pressure water spraying system complying with Schedule 3 in Merchant Shipping Notice MSN 1666 (M) for the protection of all parts of any deck and vehicle platform in such space, except that the Secretary of State may permit the use of any other fixed fire-extinguishing system that has been shown by full scale test to be no less effective.

The subparagraphs of this paragraph are listed in the left hand vertical columns of Tables 1, 2 and 3.

- 4. The classes of dangerous goods referred to in this Schedule are those specified in the Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations. Such classes are listed in the top horizontal rows of Tables 2 and 3.
- 5. Ships and cargo spaces in categories A, B, C or E shall comply with a particular subparagraph of paragraph 3 if -
  - (a) an "X" appears in Table 1 where the vertical column for that Category crosses the horizontal row for that subparagraph; and
  - (b) the dangerous goods (not being solid dangerous goods carried in bulk) which the ship or space as the case may be is intended to carry are of a class included in Table 3 and an "X" appears in that table where the vertical column for that class crosses the horizontal row for that subparagraph.
- 6. Ships and cargo spaces of Category D shall comply with the requirements of a particular subparagraph of paragraph 3 if the dangerous goods (being solid dangerous goods in bulk) are of a class included in Table 2 and an "X" appears where the vertical column for that class of goods crosses the horizontal row for that subparagraph.
- 7. Any requirement in this Schedule shall be applied subject to any exception or modification set out in the footnotes to the relevant Table or Tables which is applicable to that particular case.
- 8. Where in a ship or cargo space of Category D dangerous goods of class 4.3 are carried, the Secretary of State may, having regard to the hazards of the particular dangerous goods, impose such additional requirements as he may think necessary.
- 9. Any enclosed cargo space of Category D which is not provided with power ventilation shall be provided with natural ventilation.

**TABLE 1 - APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SHIPS AND CARGO SPACES**

Paragraph 2 → Paragraph 3 ↓	(A) Not Specifically designed	(B) Container cargo spaces	(C)			(D) Intended for solid dangerous goods in bulk	(E) Shipborne barges
			Closed ro-ro cargo spaces	Open ro-ro cargo spaces	Weather decks		
(a) Immediate availability of water supplies	X	X	X	X	X	For application of requirements of these Regulations to different classes of dangerous goods – see Table 2	—
(b) Quantity of water	X	X	X	X	X		—
(c) Water cooling	X	X	X	X	—		X
(d) Cargo space flooding	X	X	X	X	—		X
(e) Electrical equipment	X	X	X	X	—		X <sup>d</sup>
(f) Fire detection	X	X	X	—	—		X <sup>d</sup>
(g) Power ventilation	X	X <sup>a</sup>	X	—	—		X <sup>d</sup>
(h) Fans	X	X <sup>a</sup>	X	—	—		X <sup>d</sup>
(i) Bilge pumping	X	X	X	—	—		—
(j) Protective clothing	X	X	X	X	X		—
(k) Breathing apparatus	X	X	X	X	X		—
(l) Fire extinguishers	X	—	—	X	X		—
(m) Insulation of boundaries	X	X <sup>b</sup>	X	X	X		—
(n) Water spray	—	—	X <sup>c</sup>	X	—		—

Notes (Table 1)

- a** For dangerous goods of classes 4 and 5.1 not applicable to closed freight containers. For dangerous goods of classes 2, 3, 6.1 and 8 when carried in closed freight containers the ventilation rate may be reduced to not less than two air changes. For the purpose of this requirement a portable tank is a closed freight container.
- b** Applicable to decks only.
- c** Applies only to closed ro-ro cargo spaces, not capable of being sealed.
- d** In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Secretary of State.

**TABLE 2 - APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF  
DANGEROUS GOODS FOR SHIPS AND CARGO SPACES CARRYING SOLID  
DANGEROUS GOODS IN BULK**

Class of Dangerous Goods →		4.1	4.2	4.3 <sup>f</sup>	5.1	6.1	8	9
Paragraph 3 ↓								
(a)	Immediate availability of water supplies	X	X	—	X	X <sup>g</sup>	X <sup>g</sup>	X
(b) <sup>e</sup>	Quantity of water	X	X	—	X	—	—	X
(e)	Electrical equipment	X	X <sup>g</sup>	X	X <sup>g</sup>	—	—	X <sup>g</sup>
(g) <sup>h</sup>	Power ventilation	X <sup>g</sup>	X <sup>g</sup>	X	X <sup>g</sup>	—	—	X <sup>g</sup>
(h) <sup>h</sup>	Fans	X	X <sup>g</sup>	X	X <sup>g</sup>	—	—	X <sup>g</sup>
(j) & (k)	Personnel protection	X	X	X	X	X	X	X
(m)	Insulation of boundaries	X	X	X	X <sup>g</sup>	X <sup>g</sup>	X <sup>g</sup>	X

Notes (Table 2)

- e** This requirement is applicable only when the characteristics of the substance call for large quantities of water for fire fighting.
- f** For possible additional requirements see paragraph (11).
- g** Further requirements which may be applicable in a particular case are contained in the International Maritime Dangerous Goods Code (resolution A81(IV) as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended) as appropriate; as published by the International Maritime Organisation.
- h** In cases where power ventilation is required in the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended) the use of portable ventilation units or equipment to the satisfaction of the Secretary of State may suffice.

**TABLE 3 - APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF  
DANGEROUS GOODS EXCEPT SOLID DANGEROUS GOODS IN BULK**

Class of Dangerous Goods		1	2	3	4	5.1	5.2	6.1	8
(a)	Immediate availability of water supplies	X	X	X	X <sup>o</sup>	X	X <sup>o</sup>	X	X
(b) <sup>i</sup>	Quantity of water	X	X	X	X <sup>o</sup>	X	X <sup>o</sup>	—	—
(c)	Water cooling	X <sup>k</sup>	—	—	—	—	—	—	—
(d)	Cargo space flooding	X <sup>k</sup>	—	—	—	—	—	—	—
(e)	Electrical equipment	X <sup>k</sup>	X <sup>l</sup>	X <sup>m</sup>	—	—	—	X <sup>m/o</sup>	X <sup>m/o</sup>
(f)	Fire detection	X	X	X	X	X	—	X	X
(g)	Power ventilation	—	X <sup>j</sup>	X <sup>m</sup>	X <sup>o</sup>	X <sup>o</sup>	—	X <sup>m/o</sup>	X <sup>m/o</sup>
(h)	Fans	—	X <sup>l</sup>	X <sup>m</sup>	—	—	—	X <sup>m/o</sup>	X <sup>m/o</sup>
(i)	Bilge pumping	—	—	X <sup>m</sup>	—	—	—	X <sup>n</sup>	X <sup>m</sup>
(j) & (k)	Personnel protection	—	X	X	X	X	X <sup>o</sup>	X	X
(l)	Fire extinguishers	—	—	X	X	X	X <sup>o</sup>	X <sup>o</sup>	X <sup>o</sup>
(m)	Insulation of boundaries	X <sup>k</sup>	X	X	X	X <sup>o</sup>	—	X <sup>o</sup>	X <sup>o</sup>
(n)	Water spray	X	X	X <sup>m</sup>	X <sup>o</sup>	X	—	X <sup>m</sup>	X <sup>m</sup>

Notes (Table 3)

- i** This requirement is applicable only when the characteristics of the substance call for large quantities of water for fire fighting.
- j** Applicable only to flammable or poisonous gases.
- k** Except dangerous goods of class 1 in division 1.4 compatibility group S.
- l** Applicable only to flammable gases.
- m** Applicable only to liquids having a flashpoint below 23°C (closed cup test).
- n** Applicable only to liquids.
- o** Further requirements which may be applicable are contained in the International Maritime Dangerous Goods Code (resolution A81(IV) as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended) as appropriate.

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