



STATUTORY INSTRUMENTS.

S.I. No. 379 of 2023



MERCHANT SHIPPING (FIRE PROTECTION) RULES 2023

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MERCHANT SHIPPING (FIRE PROTECTION) RULES 2023

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MERCHANT SHIPPING (FIRE PROTECTION) RULES 2023

I, JACK CHAMBERS, Minister of State at the Department of Transport, in exercise of the powers conferred on me by section 10 of the Merchant Shipping (Safety Convention) Act 1952 (No. 29 of 1952) (inserted by section 7(1) of the Merchant Shipping Act 2010 (No. 14 of 2010)), section 3 of the Merchant Shipping Act 1966 (No. 20 of 1966), as amended by section 12 of the Merchant Shipping Act 2010, section 84 of the Merchant Shipping Act 2010 (as adapted by the Transport, Tourism and Sport (Alteration of Name of Department and Title of Minister) Order 2020 (S.I. No. 351 of 2020)) and the Transport (Delegation of Ministerial Functions) Order 2023 (S.I. No. 211 of 2023), and for the purpose of giving effect to the provisions of Chapter II-2 of the annex to the International Convention for the Safety of Life at Sea, 1974, hereby make the following rules:

PART 1

PRELIMINARY AND GENERAL

Citation

1. These Rules may be cited as the Merchant Shipping (Fire Protection) Rules 2023.

Interpretation

2. (1) In these Rules –

“‘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;
- (d) so insulated where necessary with suitable non-combustible materials such 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, or in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, not more than 140°C, above the initial temperature, nor shall the temperature at any one point, including any joint, rise more than 180°C above the initial temperature within the time listed below:

Class "A-60" 60 minutes

Class "A-30" 30 minutes

*Notice of the making of this Statutory Instrument was published in
"Iris Oifigiúil" of 25th July, 2023.*

Class "A-15" 15 minutes

Class "A-0" 0 minutes; and

- (e) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, the Minister has required a test of a prototype bulkhead or deck to ensure that it is in compliance with the requirements of the Regulations of 2017;

“accommodation spaces” means –

- (a) public spaces;
- (b) corridors and lobbies;
- (c) stairways;
- (d) lavatories;
- (e) cabins;
- (f) offices;
- (g) hospitals;
- (h) hairdressing salons and barber shops;
- (i) pantries containing no cooking appliances;
- (j) lockers;
- (k) games and hobbies' rooms;
- (l) spaces similar to any of the foregoing and trunks to such spaces allocated to passengers or crew;

“approved” means approved by the Minister;

“B’ class division” means a bulkhead, part of a deck, ceiling or lining which is:

- (a) so constructed as to be capable of preventing the passage of flame to the end of the first 30 minutes of the standard fire test;
- (b) so constructed as to provide an insulation standard such 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, or in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, not more than 140°C, above the initial temperature, nor shall the temperature at any one point, including any joint, rise more than 225°C above the initial temperature within the time listed below:

Class “B-15” 15 minutes

Class “B-0” 0 minutes;

- (c) constructed of suitable non-combustible materials and all materials whose use is necessary for or ancillary to its construction and erection shall be non-combustible, with the exception that combustible veneers may be permitted provided that they meet the requirements of Rules 93, 110, 131 or 147; and

- (d) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, the Minister has required a test of a prototype division to ensure that it is in compliance with the requirements of the Regulations of 2017;

“bulkhead deck” means the uppermost deck up to which transverse watertight bulkheads are carried;

“C” class division” means a bulkhead, ceiling or lining which is constructed of suitable non-combustible materials not being an “A” class division or a “B” class division;

“cargo area” means that part of a ship which contains:

- (a) cargo tanks, slop tanks and cargo pump rooms; and
- (b) the following spaces when they are adjacent to the cargo tanks, namely, pump rooms other than cargo pump rooms, cofferdams, ballast spaces and void spaces;

and extends fore and aft between the forward end of the most forward of those tanks or other spaces and the after end of the aftermost of those tanks or other spaces and athwartships over the whole breadth of the ship; and the deck area over that part of the ship;

“cargo control station” means a space from which the loading, discharging or transferring of any cargo may be controlled;

“cargo pump room” means a room in which pumps used for loading, discharging or transferring cargoes are located;

“cargo ship” means a ship that is not a passenger ship;

“Cargo Ship Construction Rules 1985” means the Merchant Shipping (Cargo Ship Construction and Survey) Rules 1985 (S.I. No. 276 of 1985);

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

“central control station”, in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 January 1994, means a control station in which the following control and indicator functions are centralised:

- (a) fixed fire detection and alarm systems;
- (b) automatic sprinklers, fire detection and alarm systems;
- (c) fire door indicator panels;
- (d) fire door closures;
- (e) watertight door indicator panels;
- (f) watertight door closures;
- (e) ventilation fans;
- (f) general and fire alarms;
- (g) communication systems including telephones; and
- (h) microphones to public address systems;

“certificate of fitness for the carriage of dangerous chemicals in bulk” means a certificate in compliance with the requirements of the “Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk” or the “International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk”;

“certificate of fitness for the carriage of liquefied gases in bulk” means a certificate in compliance with the requirements of the “Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk” or the “International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk”;

“chemical tanker” means a tanker constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in either:

- (a) Chapter 17 of the International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; or
- (b) Chapter VI of the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk,

whichever is applicable;

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

“Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk” means the code so entitled and adopted by the IMO by Resolution A.212(VII);

“Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk” means the code so entitled and adopted by the IMO by Resolution A.328(IX);

“combination carrier” means a tanker designed to carry oil or alternatively solid cargoes in bulk;

“continuous ‘B’ class ceiling or lining” means a “B” class division forming a ceiling or lining which terminates only at an “A” or “B” class division;

“continuously manned central control station” means a central control station that is continuously manned by a responsible member of the crew;

“control room” means a room either within or outside a propulsion machinery space from which propulsion machinery and boilers may be controlled;

“control stations” means spaces in which radio or main navigating equipment, or the emergency source of power, or the central fire recording equipment, or fire control equipment, or fire extinguishing installations are located or a control room located outside a propulsion machinery space;

“crude oil” means any oil occurring naturally in the earth whether or not treated to render it suitable for transportation and includes:

- (a) crude oil from which certain distillate fractions may have been removed; and
- (b) crude oil to which certain distillate fractions may have been added;

“dangerous goods” means goods as defined in the Merchant Shipping (Dangerous Goods) Rules 1992 (S.I. No. 391 of 1992) and any reference to a particular class of dangerous goods is a reference to that class of dangerous goods as defined in those Rules;

“deadweight” means the difference in tonnes between the displacement of a ship in water of a specific gravity of 1.025 at the load waterline corresponding to the assigned summer freeboard and the lightweight of the ship;

“equivalent material” as used in the expression "steel or other equivalent material" means any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of an appropriate fire test;

“existing ship” means a ship which is not a new ship;

“Fire Test Procedures Code” means the International Code for Application of Fire Test Procedures, as adopted by the Maritime Safety Committee of the IMO by Resolution MSC.61(67), as may be amended by the IMO, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the Safety Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

“fishing vessel” means a vessel designed, equipped or used commercially for catching or taking fish or other living resources of the sea (including the sea bed) or freshwater;

“gas carrier” means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or certain other substances of a flammable nature listed in either -

- (a) Chapter 19 of the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk, or
- (b) Chapter XIX of the Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk,

whichever is applicable;

“gas safe space” means a space into which the entry of hydrocarbon gases or other gases of a flammable or toxic nature has been restricted;

“Guidelines for Inert Gas Systems” means the revised IMO Guidelines for Inert Gas Systems contained in MSC/Circ.353 as amended by MSC/Circ.387;

“IMDG Code” means the International Maritime Dangerous Goods (IMDG) Code adopted by the Maritime Safety Committee of the IMO by Resolution MSC.122(75), in its updated version;

“IMO” means the International Maritime Organization;

“IMSBC Code” means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the IMO by Resolution MSC.268(85), in its updated version;

“International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk” means the code so entitled adopted by the Maritime Safety Committee of the IMO by Resolution MSC.4(48);

“International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk” means the code so entitled adopted by the Maritime Safety Committee of the IMO by Resolution MSC.5(48);

“length” in relation to a registered ship means registered length, and in relation to an unregistered ship means the length from the fore part of the stem to the aft side of the head of the stern post or, if no stern post is fitted to take the rudder, to the fore side of the rudder stock at the point where the rudder passes out of the hull;

“lightweight” means the displacement of a ship in tonnes without cargo, fuel, lubricating oil, ballast water, fresh water and feedwater in tanks, consumable stores, and passengers and crew and their effects;

“low flame spread” means that the surface thus described shall adequately restrict the spread of flame, this being determined in accordance with Annex 1, Part 5 of the Fire Test Procedures Code and IMO Resolution A.653(16);

“machinery spaces” means spaces that contain propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilising ventilation and air conditioning machinery and similar spaces, and where the context so admits, any trunk to such a space;

“machinery spaces of Category A” means machinery spaces that contain –

- (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 fuel unit,

and any trunk to such a space;

“main vertical zones” means –

- (a) the main vertical zones into which the hull, superstructure and deck houses of a ship are divided in accordance with Rule 85 or 102, or
- (b) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 October 1994, those sections into which the hull, superstructure and deckhouses are divided by “A” class divisions, the mean length and width of which on any deck does not in general exceed 40 m;

“new ship” means a ship the keel of which was laid or which was at a similar stage of construction on or after 1 September 1984;

“newly converted passenger ship” means an existing ship other than a passenger ship which is converted into a passenger ship after 1 September 1984, such conversion having commenced after that date;

“non-combustible material” means –

- (a) material which when heated to a temperature of 750°C neither flames for longer than 10 s duration, nor raises either its internal temperature or the temperature of the test furnace more than 50°C

above 750°C when tested in accordance with British Standard Specification 476: Part 4: 1970, and the expression “combustible material” shall be construed accordingly, or

- (b) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, a material that neither burns nor gives off flammable vapours in sufficient quantity for self-ignition when heated to approximately 750°C, this being determined in accordance with Part 1 of the Fire Test Procedures Code. Any other material is a “combustible material”;

“oil-fired boiler” means a boiler wholly or partly fired by liquid fuel;

“oil fuel unit” means the equipment used for the preparation of oil fuel for delivery to an oil-fired boiler or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any pressure pumps, filters and heaters dealing with oil at a pressure greater than 1.8 bar (0.18 N/mm²);

“open ro-ro cargo space” means a ro-ro cargo space that is 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;

“passenger ship” means a ship that carries more than 12 passengers;

“Passenger Ship Construction Rules 1985” means the Merchant Shipping (Passenger Ship Construction and Survey) Rules 1985 (S.I. No. 274 of 1985);

“pleasure craft” means a vessel primarily used for sport or recreation;

“public spaces” includes halls, dining rooms, bars, smoke rooms, lounges, recreation rooms, nurseries, libraries, cinemas, sale shops and similar permanently enclosed spaces allocated to passengers or crew;

“Regulations of 2017” means the European Union (Marine Equipment) Regulations 2017 (S.I. No. 177 of 2017);

“Reid vapour pressure” means the vapour pressure of a liquid as determined by laboratory testing in a standard manner in the Reid apparatus;

“rooms containing furniture and furnishings of restricted fire risk” means rooms in which:

- (a) all case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, is constructed entirely of approved non-combustible materials, except that a combustible veneer not exceeding 2 mm may be used on the finished surface of such furniture;
- (b) all free-standing furniture such as chairs, sofas, tables, is constructed with frames of non-combustible materials;
- (c) all draperies, curtains and other suspended textile materials have qualities of resistance to the propagation of flame in accordance with
 - (i) the requirement of Type B performance of British Standard 5867: Part 2:1980; or

- (ii) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1997, to the satisfaction of the Minister, not inferior to those of wool of mass 0.8kg/m^2 ; or
- (iii) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, not inferior to those of wool of mass 0.8kg/m^2 , this being determined in accordance with Part 7 of the Fire Test Procedures Code;
- (d) all surface floor coverings have qualities of resistance to the propagation of flame to the satisfaction of the Minister and, in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, all floor coverings have low flame spread characteristics;
- (e) the upholstered parts of furniture have qualities of resistance to the ignition and propagation of flame to the satisfaction of the Minister and, in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, all upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with Part 8 of the Fire Test Procedures Code and IMO Resolution A.652(16); and
- (f) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, all bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with Part 9 of the Fire Test Procedures Code and IMO Resolution A.688(17);

“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), trailers, containers, pallets, demountable tanks or in or on similar stowage units or other receptacles) can be loaded and unloaded normally in a horizontal direction;

“ro-ro passenger ship” means a passenger ship with ro-ro cargo spaces or special category spaces;

“Safety Convention” means the International Convention for the Safety of Life at Sea signed in London on behalf of the Government on 1 November 1974 together with the Protocol to the International Convention for the Safety of Life at Sea signed in London on behalf of the Government on 17 February 1978 and the Protocol to the International Convention for the Safety of Life at Sea signed in London on behalf of the Government on 11 November 1988 and any amendments made to it up to and including those adopted by the 99th session of the Maritime Safety Committee of the International Maritime Organization held between 16 and 25 May 2018 and which have entered into force in respect of the State pursuant to Article VIII prior to the passing of the Merchant Shipping (Investigation of Marine Casualties) (Amendment) Act 2022 (No. 8 of 2022) on 16 May 2022;

“sailing ship” includes a ship provided with sufficient sail area for navigation under sails alone, whether or not fitted with mechanical means of propulsion;

“service spaces” include galleys, pantries containing cooking appliances, laundries, drying rooms, lockers and store rooms, paint rooms, baggage rooms, mail and specie rooms, workshops (other than those forming part of machinery spaces) and similar spaces and trunks to such spaces;

“similar stage of construction” means the stage at which –

- (a) construction identifiable with a specific ship begins, and
- (b) assembly of that ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural material, whichever is less;

“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;

“standard fire test” means –

- (a) a test in which a specimen of the relevant “A” class or “B” class division, having an exposed surface area of not less than 4.65 m² and a bulkhead height or deck length of 2.44 m, resembling as closely as possible the intended construction and including where appropriate at least one joint, is exposed in a test furnace to a series of time temperature relationships defined by a smooth curve drawn through the following temperature points measured above the initial furnace temperature:

At the end of the first 5 minutes 556°C

At the end of the first 10 minutes 659°C

At the end of the first 15 minutes 718°C

At the end of the first 30 minutes 821°C

At the end of the first 60 minutes 925°C, or

- (b) in the case of a ship of Class I, II, VII, VIII, VII(T) or VIII(T) constructed on or after 1 July 1998, a test in which the specimens of the relevant bulkheads and decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve. The test methods shall be in accordance with Annex 1, Part 3 of the Fire Test Procedures Code, IMO Resolution A.754(18) and the Regulations of 2017;

“suitable” in relation to material means approved by the Minister as suitable for the purpose for which it is used;

“surface spread of flame” means the surface spread of flame classified as Class 1 or Class 2 within the meaning of British Standard 476: Part 7: 1971;

“tanker” means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of an inflammable nature;

“tons” means the gross tonnage of a ship, being the measure of the overall size of a ship determined in accordance with the International Convention on Tonnage Measurement of Ships 1969 or, in the case of an existing ship, the keel of which was laid before 18 July 1982, the gross tonnage ascertained having regard to Regulation 10(2) of the Mercantile Marine (Tonnage) Regulations 2007 (S.I. No. 369 of 2007);

“water seal” means an arrangement or device using water, to prevent the back flow of gases or vapours from cargo tanks into gas safe spaces;

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

(2) A reference in these Rules to:

- (a) the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;
- (b) the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;
- (c) the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;
- (d) the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;
- (e) the IMDG Code;
- (f) the Code of Safe Practice for Solid Bulk Cargoes;
- (g) the Guidelines for Inert Gas Systems;
- (h) a British or ISO Standard;

shall where appropriate include that publication in its updated version.

Application

3. (1) These Rules shall apply to ships registered in the State which are:

- (a) new ships;
- (b) newly converted passenger ships;
- (c) to the extent that the Minister deems reasonable and practical, to any major repairs, alterations, modifications and outfitting –
 - (i) to existing ships registered in the State commencing on or after 1 September 1984, provided that any such repairs, alterations and modifications carried out pursuant to a contract entered into before 1 September 1984 shall be deemed to have commenced before that date, or
 - (ii) to ships registered in the State that are constructed on or after dates specified in the Rules, provided that any such repairs, alterations, modifications and outfitting are carried out pursuant to a contract entered into on or after those specified dates; and

- (d) other new seagoing ships while they are within a port in the State, except –
- (i) a ship by reason of her being within a port in the State if she would not have been in any such port but for stress of weather or any other circumstances that neither the master nor the owner nor the character (if any) could have prevented;
 - (ii) pleasure craft which are not passenger ships and are of less than 13.7 m in length;
 - (iii) fishing vessels.

(2) Any approval given in pursuance of these Rules shall be given in writing and shall specify the date on which it takes effect and the conditions, if any, subject to which it is given.

Classification of ships

4. (1) The ships to which these Rules apply shall be arranged in the following classes:

- (a) Passenger ships:

Class	Description
Class I	Passenger ships engaged on voyages (not being short international voyages) any of which are long international voyages.
Class II	Passenger ships engaged on voyages (not being long international voyages) any of which are short international voyages.
Class II(A)	Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class II(A)" being a certificate for ships engaged on voyages of any kind other than international voyages.
Class III	Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class III" being a certificate for ships engaged only on voyages in the course of which they are at no time more than 70 miles by sea from their point of departure and not more than 18 miles from the coast of the State, and which are at sea only in fine weather and during restricted periods.
Class IV	Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class IV" being a certificate for ships engaged only on voyages in partially smooth waters, or in smooth and partially smooth waters.
Class V	Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class V" being a certificate for ships engaged only on voyages in smooth waters.
Class VI	Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class VI" being a certificate for ships engaged only on voyages with not more than 250 passengers on board, to sea, in smooth or in partially smooth waters, in all cases in fine weather and during restricted periods in the course of which the ships are at no time more than 15 miles, exclusive of any smooth waters, from their point of departure nor more than 3 miles from land.

(b) Ships other than passenger ships:

Class	Description
Class VII	Ships (other than ships of Classes I, VII(T), XI and XII) engaged on voyages any of which are long international voyages.
Class VII(T)	Tankers engaged on voyages any of which are long international voyages.
Class VIII	Ships (other than ships of Classes II, VIII(T), IX, XI and XII) engaged on voyages (not being long international voyages) any of which are short international voyages.
Class VIII(A)	Ships (other than ships of Classes II(A) to VI inclusive, VIII(A)(T), IX, IX(A), XI and XII) engaged on voyages which are not international voyages.
Class VIII(T)	Tankers engaged on voyages (not being long international voyages) any of which are short international voyages.
Class VIII(A)(T)	Tankers engaged only on voyages which are not international voyages.
Class IX	Tugs and tenders (other than ships of Classes II, II(A), III and VI) which proceed to sea but are not engaged on long international voyages.
Class IX(A)	Ships (other than ships of Classes IV to VI inclusive) that do not proceed to sea.
Class IX(A)(T)	Tankers that do not proceed to sea.
Class XI	Sailing ships (other than ships of Class XII) that proceed to sea.
Class XII	Pleasure craft (other than ships of Classes I to VI inclusive) of 13.7 m in length or greater.

(2) In this Rule –

“long international voyage” means an international voyage which is not a short international voyage within the meaning of the Merchant Shipping (Safety Convention) Act 1952 (No. 29 of 1952);

“partially smooth waters” means the waters of the areas specified in column 3 of the Table to Schedule 15 with the restriction, if any, as to time and type of vessel specified in that column in relation to those waters;

“restricted period” means a period falling wholly within the following limits:

- (a) from 1 April to 31 October, both dates inclusive;
- (b) between one hour before sunrise and one hour after sunset in the case of ships fitted with navigation lights conforming with the Merchant Shipping (Collision Regulations) (Ships and Water Craft on the Water) Order 2012 (S.I. No. 507 of 2012) and between sunrise and sunset in the case of any other ships;

“sea” does not include any smooth or partially smooth waters;

“smooth waters” means any areas of water not being the sea or partially smooth waters and, in particular, means waters of any of the areas specified in column 2 of the Table to Schedule 15;

“voyage” includes an excursion.

Compliance with Regulations of 2017

5. In a ship to which these Rules apply, all shipboard marine equipment, as listed in implementing acts of the European Union adopted in accordance with Article 35 of Directive 2014/90/EU of the European Parliament and of the Council of 23 July 2014¹, placed on board the ship on or after 1 January 1999, shall comply with the Regulations of 2017.

PART 2

FIRE PREVENTION AND FIRE APPLIANCES

Passenger Ships

*Ships of Class I**Fire pumps, fire main, water service pipes, hydrants, hoses and nozzles*

6. (1) Every passenger ship shall be provided with appliances in accordance with this Rule whereby at least 2 jets of water as required by these Rules, can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty.

(2) Every passenger ship of 4,000 tons or greater shall be provided with at least 3 fire pumps operated by power and every passenger ship of less than 4,000 tons shall be provided with at least 2 such pumps. Each fire pump shall be capable of delivering at least one jet of water simultaneously from each of any 2 hydrants, hoses and nozzles provided in the ship and shall comply with the requirements of Rule 61.

- (3) (a) In every passenger ship of 1,000 tons or greater, the arrangement of the sea connections, pumps and the sources of power for operating them shall be such as will ensure that a fire in any one compartment will not put all the fire pumps out of action.
- (b) If in any passenger ship of less than 1,000 tons a fire in any one compartment could put all the fire pumps out of action, there shall be provided, in a position outside the machinery spaces, an independently driven power operated emergency fire pump and its source of power and sea connection. Such pump shall be capable of producing at least one jet of water simultaneously from each of any 2 hydrants and hoses through nozzles which shall comply with Rule 63(4)(b), while simultaneously maintaining a pressure of at least 0.21 N/mm² at any hydrant in the ship.
- (4) (a) In every passenger ship there shall be provided a fire main, water service pipes, hydrants, hoses and nozzles which shall be so arranged that they comply with the requirements of Rules 62 and 63 when all watertight doors and all doors in main vertical zone bulkheads are closed.
- (b) In every passenger ship of 1,000 tons or greater, the arrangement of fire pumps, fire mains and hydrants shall be such that at least

¹ OJ No. L 257, 28.8.2014, p. 146.

one jet of water is immediately available from any one hydrant in an interior location. Arrangements shall also be made to ensure the continuation of the output of water by the automatic starting of a fire pump required by these Rules.

(5) In every passenger ship at least one fire hose shall be provided for every hydrant fitted in compliance with these Rules. Such hoses shall be used only for the purpose of extinguishing fires or for testing the fire extinguishing appliances at fire drills and surveys.

(6) In every passenger ship where in any machinery space of Category A access is provided at a low level from an adjacent shaft tunnel, 2 hydrants fitted with hoses and nozzles shall be provided external to, but near the entrance to, that machinery space. Where such access is not provided from a tunnel but is provided from another space or spaces, there shall be provided in one of those spaces 2 hydrants fitted with hoses and nozzles near the entrance to the machinery space of Category A. Such provisions need not be made when the tunnel or adjacent spaces are not part of an escape route.

(7) In every passenger ship all required hydrants in machinery spaces shall be fitted with hoses and nozzles. Additionally, in respect of ships carrying more than 36 passengers, each machinery space of Category A shall be provided with at least 2 suitable water fog applicators.

(8) In every passenger ship in every special category space and ro-ro cargo space the number of hydrants with hoses shall be so arranged that at least 2 jets of water each from a single length of hose, not emanating from the same hydrants, may reach any part of the space. Such hydrants shall be positioned near the accesses to the protected spaces.

(9) In every passenger ship at least 3 water fog applicators in addition to the nozzles required by these Rules shall be provided in special category spaces.

Portable fire extinguishers in accommodation, cargo and service spaces

7. (1) In every ship of Class I there shall be provided on each deck below the bulkhead deck a sufficient number of portable fire extinguishers so that at least 2 shall be readily available for use in every accommodation space, service space and control station between main vertical zones. In enclosed accommodation spaces, service spaces and control stations above the bulkhead deck at least one such extinguisher shall be provided for use on each side of the ship in such spaces. The number of such extinguishers in such spaces shall not be less than 5 in a ship of 1,000 tons or greater. In addition, at least one portable fire extinguisher and a fire blanket shall be provided in every galley; provided that where the deck area of any galley exceeds 45m², at least 2 such extinguishers and 2 such blankets shall be provided.

(2) In every ship of Class I at least one portable fire extinguisher shall be provided for use in each control station.

(3) One of the portable fire extinguishers intended for use in any space shall be available near the entrance to that space.

(4) In every ship of Class I there shall be provided in each special category space and cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion —

- (a) at least 2 portable extinguishers, suitable for extinguishing oil fires, for every 40 m length of deck space, so arranged that at least one extinguisher is available on each side of the space and at least one extinguisher is available at each access to the space;
- (b) one portable foam applicator unit complying with the requirements of Schedule 6; not less than 2 such applicators shall be available in the ship for use in any such space.

Fixed fire extinguishing systems in cargo spaces

8. (1)(a) In every ship of Class I of 1,000 tons or greater and in every ship of Class I engaged in the carriage of dangerous goods, there shall be provided a fixed gas fire extinguishing system complying with the requirements of Schedule 10 to protect every cargo space, (other than special category spaces and spaces where a fixed pressure water spraying system is fitted in accordance with paragraphs (3) and (4)).

- (b) The Minister may exempt any ship (other than a ship engaged in the carriage of dangerous goods) from the requirements of paragraph (1) if he or she is satisfied that to require compliance therewith would be unreasonable on account of the short duration of the voyages on which the ship is engaged.

(2) In every ship of Class I there shall be provided in each special category space a fixed pressure water spraying system complying with the requirements of Schedule 9. The Minister may permit in lieu of such a system any other fixed fire extinguishing system provided that it has been shown by full-scale test in conditions simulating a flowing petrol fire in a special category space to be not less effective in controlling fires likely to occur in such a space.

(3) In every ship of Class I there shall be provided in each cargo space (other than special category space) intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion a fixed pressure water spraying system complying with the requirements of Schedule 9, or a fixed gas fire extinguishing system complying with the requirements of Schedule 10.

(4) In every ship of Class I there shall be provided in 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, a fixed pressure water spraying system complying with Schedule 9.

Special requirements for cargo space ventilation

9. (1) In every ship of Class I there shall be provided:
- (a) in each special category space, an effective power ventilation system sufficient to give at least 10 air changes per hour; the

Minister may require an increased number of air changes when vehicles are being loaded and unloaded;

- (b) in each cargo space, other than special category spaces, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, an effective power ventilation system sufficient to give at least 10 air changes per hour for ships carrying more than 36 passengers and 6 air changes per hour for ships carrying not more than 36 passengers.

(2) The power ventilation systems referred to in subparagraphs (1)(a) and (1)(b) shall be entirely separate from other ventilation systems and shall be operated at all times when vehicles are in such spaces. Ventilation ducts serving such spaces capable of being effectively sealed shall be separated from each such space. The system shall be capable of being controlled from a position outside such spaces. In addition:

- (a) the ventilation shall be such as to prevent air stratification and the formation of air pockets;
- (b) means shall be provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity;
- (c) arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire, taking into account the weather and sea conditions.

(3) Permanent openings in the side plating, the ends or deckhead shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation of cargo spaces.

(4) In each special category space the electrical equipment shall comply with Rule 53(3) of the Passenger Ship Construction Rules 1985 and in each cargo space, other than special category space, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the electrical equipment shall comply with Rule 53(4) of the Passenger Ship Construction Rules 1985.

Machinery spaces of Category A

10. (1) In every ship of Class I there shall be provided for the protection of any machinery space of Category A at least one of the following fixed fire extinguishing systems:

- (a) a fixed pressure water spraying system, complying with the requirements of Schedule 8;
- (b) a fixed gas fire extinguishing system complying with the requirements of Schedule 10.

If the engine and boiler rooms are not entirely separated from each other by a bulkhead or if fuel oil can drain from the boiler room into the engine room, the combined engine and boiler rooms shall, for the purpose of this paragraph, be regarded as a single space.

(2) In addition to the requirements of paragraph (1), there shall be provided:

- (a) in each boiler room, one or more foam fire extinguishers each of at least 135 litres capacity or carbon dioxide fire extinguishers each of at least 45 kilogrammes capacity placed in such positions as to be readily accessible in the event of fire and sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room and spaces containing any part of the oil fuel installation;
 - (b) in each boiler room, at least one portable foam applicator unit complying with Schedule 6;
 - (c) in each firing space and in each space which contains any part of any oil fuel installation, at least 2 portable fire extinguishers suitable for extinguishing oil fires;
 - (d) in each firing space, a receptacle containing at least 0.3m³ of sand or other dry material suitable for extinguishing oil fires together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.
- (3) In addition to the requirements of paragraph (1), there shall be provided in any space containing internal combustion type machinery:
- (a) one or more foam fire extinguishers of at least 45 litres or carbon dioxide extinguishers of at least 16 kilogrammes capacity. The extinguishers shall be sited so as to be readily accessible in the event of fire and shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other areas of high fire risk;
 - (b) at least one portable foam applicator unit complying with the requirements of Schedule 6;
 - (c) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 m walking distance from any position within the space, provided that there shall be not less than 2 such extinguishers; and
 - (d) in passenger ships carrying more than 36 passengers each machinery space of Category A shall be provided with at least 2 suitable water fog applicators.

Machinery spaces containing steam turbines or enclosed steam engines

11. In every ship of Class I there shall be provided in spaces containing steam turbines or enclosed pressure lubricated steam engines used either for main propulsion, or having in the aggregate a total power of not less than 375 kW for auxiliary purposes:

- (a) foam fire extinguishers each of at least 45 litres capacity of carbon dioxide or fire extinguishers each of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the pressure lubrication system and

on to any part of the casings enclosing pressure lubricated parts of the turbine, engines or associated gearing and any other areas of high fire risk; provided that such extinguishers shall not be required if equivalent protection is provided in such spaces by a fixed fire extinguishing system fitted in compliance with Rule 10(1);

- (b) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 m walking distance from any position within the space; provided that there shall be not less than 2 such extinguishers;
- (c) in addition, where such spaces are not to be periodically unattended, either a fixed pressure water spraying system complying with the requirements of Schedule 8, or a fixed gas fire extinguishing system complying with the requirements of Schedule 10 shall be fitted.

Fire extinguishing appliances in other machinery spaces

12. In every ship of Class I, where a fire hazard exists in any machinery space for which no specific provisions for fire extinguishing are required by Rules 10 or 11, there shall be provided in or adjacent to that space a sufficient number of portable fire extinguishers to ensure that at least one extinguisher is not more than 10 m walking distance from any position within that space, unless equivalent means of fire extinction are provided.

Fire patrol, detection and alarm systems

- 13.(1)(a) In every ship of Class I, an efficient patrol system shall be maintained so that any outbreak of fire may be promptly detected. In special category spaces in which the patrol is not maintained by a continuous fire watch at all times during the voyage, there shall be provided in that space a fixed fire detection and fire alarm system of an approved type complying with Schedule 11.
 - (b) In every ship of Class I, manually operated call points complying with the requirements of Schedule 11 shall be fitted throughout the accommodation, service and special category spaces, which will enable the fire patrol to give an alarm immediately to the navigating bridge or fire control station. Such a manually operated call point shall be positioned adjacent to each exit from every special category space.
 - (c) Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he or she may be called upon to use.
- (2) In every ship of Class I there shall be provided in any part of the ship which is not reasonably accessible to the fire patrol and in each cargo space (other than special category spaces) containing motor vehicles with fuel in their

tanks for their own propulsion a fixed fire detection and fire alarm system of an approved type complying with Schedule 11 or a sample extraction smoke detection system complying with the requirements of Schedule 12.

(3) In every ship of Class I, in any machinery space where the main propulsion and associated machinery including sources of main electrical supply are provided with automatic or remote control, which are under continuous manned supervision from a control room, there shall be provided a fixed fire detection and fire alarm system of an approved type complying with Schedule 11.

(4) The Minister may exempt a ship from the requirement in paragraph (2) to provide a fixed fire alarm and fire detection system or a sample extraction smoke detection system in any part of the ship which is not accessible to the fire patrol, if he or she is satisfied that to require compliance therewith would be unreasonable on account of the short duration of the voyages on which the ship is engaged.

(5) Every ship of Class I shall at all times when at sea, or in port (except when out of service), be so manned and equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

(6) In every ship of Class I, a special alarm, operated from the navigating bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system but it shall be capable of being sounded independently of the alarm to the passenger spaces.

(7) (a) In every ship of Class I, a public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations.

(b) In the case of a ship of Class I constructed on or after 1 October 1994, the provisions of subparagraph (a) shall also apply to open decks and each member of the fire patrol shall be provided with a two-way portable radio telephone apparatus.

(8) In the case of a ship of Class I constructed on or after 1 January 1994, where public spaces span 3 or more open decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the entire main vertical zone containing the space shall be protected throughout with a smoke detection system complying with Schedule 11, with the exception of paragraph 1(i) of that Schedule.

(9) (a) A ship of Class I carrying more than 36 passengers constructed on or after 1 October 1994 shall have the detection alarms for the systems required by Rule 95(1)(a) centralized in a continuously manned central control station. In addition, controls for remote closing of the fire doors and shutting down the ventilation fans shall be centralised in the same location. The ventilation fans shall be capable of reactivation by the crew at the continuously manned control station. The control panels in the central control station shall be capable of indicating open or closed positions of fire doors, closed or off status of the detectors, alarms and fans. The control panel shall be continuously powered and should have an automatic change-over to standby power supply in case of loss

of normal power supply. The control panel shall be powered from the main source of electrical power and the emergency source of electrical power defined by all relevant Rules in Part IV of the Merchant Shipping (Passenger Ship Construction and Survey) Rules 1985 (S.I. No. 274 of 1985) unless other arrangements are permitted by the Rules, as applicable.

- (b) In the case of a ship of Class I carrying more than 36 passengers constructed on or after 1 October 1994, the control panel shall be designed on the fail-safe principle, in that an open detector circuit or a failure of the alarm and monitoring system shall cause an alarm condition, as noted in paragraph 1(c) of Schedule 12.

Fire-fighter's outfits

- 14. (1) Every ship of Class I shall be provided with —
 - (a) 2 fire-fighters outfits and, in addition,
 - (b) (i) 2 fire-fighter's outfits for every 80 m (or part thereof) of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths;
 - (ii) in the case of a passenger ship carrying more than 36 passengers, 2 additional fire-fighter's outfits shall be provided for each main vertical zone except in the case of stairway enclosures which constitute individual main vertical zones or for the main vertical zones in the fore or aft end of a ship which do not contain spaces of categories (6), (7), (8) or (12) referred to in Rule 87(3)(b);
 - (iii) every outfit shall comply with the requirements of Rule 70. Two such outfits shall include breathing apparatus of the air-hose type and the remainder shall include breathing apparatus of the self-contained type provided that where the air-hose of an air-hose type breathing apparatus has, in order to comply with paragraph 1 of Schedule 5, to exceed 36 m in length, a self-contained breathing apparatus shall be provided either in addition to or as a substitute for that air-hose type breathing apparatus;
 - (iv) in the case of a passenger ship carrying more than 36 passengers, at least 2 spare charges for each breathing apparatus shall be provided, and all air cylinders for breathing apparatus shall be interchangeable.
- (2) (a) Two fire-fighter's outfits shall be available at any one storage position.
- (b) At least 2 fire-fighter's outfits shall be stored in each main vertical zone.

(3) In every ship of Class I carrying more than 36 passengers, for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

International shore connection

15. Every ship of Class I of 500 tons or greater shall be provided with at least one international shore connection which shall comply with the requirements of Schedule 1 to enable water to be supplied from another ship or from the shore to the fire main. Fixed provision shall be made to enable such a connection to be used on the port side and on the starboard side of the ship.

Ships of Class II

Rules application to ships of Class II

16. Rules 6 to 15 inclusive shall apply to ships of Class II as they apply to ships of Class I.

Ships of Class II(A)

Rules application to ships of Class II(A) of 21.34 metres in length or greater

17. Rules 6 to 15 inclusive shall apply to ships of Class II(A) of 21.34 m in length or greater as they apply to ships of Class I.

Fire pumps, fire main, water service pipes, hydrants, hoses and nozzles

18. Every ship of Class II(A) of less than 21.34 m in length shall be provided in a position outside the machinery spaces with either a power or hand operated pump with a permanent sea connection and a hose with a 10 mm diameter nozzle capable of producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship.

Portable fire extinguishers

19. Every ship of Class II(A) of less than 21.34 m in length shall be provided with at least one portable fire extinguisher in each of the passenger spaces above the bulkhead deck, and with at least 2 such extinguishers in each of the crew spaces and in each of the passenger spaces below that deck. At least one portable fire extinguisher shall be available for use in any galley.

Machinery spaces of Category A and spaces containing oil fuel settling tanks

20. (1) In every ship of Class II(A) of less than 21.34 m in length there shall be provided in any space containing any oil-fired boiler, oil fuel settling tank or oil fuel unit, one or more foam fire extinguishers each of at least 45 litres capacity or carbon dioxide extinguishers each of at least 16 kilogrammes capacity. The extinguisher, or extinguishers, shall be sited so as to be readily accessible in the

event of a fire and shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room or space containing any part of the oil fuel installation. In addition, there shall be provided:

- (a) in each firing space and in each space which contains any part of any oil fuel installation, at least 2 portable fire extinguishers suitable for extinguishing oil fires; and
- (b) in each firing space, a receptacle containing at least 0.3 m³ of sand or other dry material suitable for extinguishing oil fires together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.

(2) In every ship of Class II(A) of 15.24 m in length or greater but of less than 21.34 m in length there shall be provided in each space containing internal combustion type propulsion machinery at least 5 portable fire extinguishers suitable for extinguishing oil fires, and every ship of Class II(A) of less than 15.24 m in length shall be provided with at least 3 such portable fire extinguishers in such spaces; provided that where internal combustion machinery is situated in a space to which paragraph (1) applies, only 2 such portable fire extinguishers need be provided in addition to the extinguishers required by that paragraph.

Ships of Class III of 21.34 metres in length or greater

Fire pumps, fire main, water service pipes, hydrants, hoses and nozzles

21. (1) Every ship of Class III of 21.34 m in length or greater shall be provided with appliances in accordance with this Rule whereby at least one jet of water as required by these Rules can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any store room and any part of any cargo space when empty.

(2) Every ship of Class III of 21.34 m in length or greater shall be provided with at least one fire pump operated by power. Each pump shall be capable of delivering at least one jet of water from any fire hydrant, hose and nozzle provided in the ship and shall comply with the requirements of Rule 62.

(3) Every ship of Class III of 21.34 m in length or greater fitted with oil-fired boilers or internal combustion type propulsion machinery shall be provided with an additional fire pump which shall be permanently connected to the fire main but which shall not be required to be operated by power. Such pump and its source of power, if any, shall not be situated in the same compartment as the pump required by paragraph (2) and shall be provided with a permanent sea connection situated outside the machinery space. If such a pump is operated by power, it shall comply with the requirements of paragraph (2), and if it is manually operated it shall be capable of producing a jet of water having a throw of not less than 6 m from nozzles provided in compliance with this Rule.

(4) Every ship of Class III of 21.34 m in length or greater shall be provided with a fire main, water service pipes, hydrants, hoses and nozzles which shall comply with the requirements of Rules 62 and 63.

(5) Every ship of Class III of 21.34 m in length or greater shall be provided with at least one fire hose for every hydrant fitted in compliance with these Rules.

(6) Every ship of Class III of 21.34 m in length or greater fitted with oil-fired boilers or internal combustion type machinery shall be provided with at least one fire hydrant in each space containing such boilers or machinery. A nozzle shall be provided for every fire hose at every hydrant fitted in such spaces in compliance with these Rules.

Portable fire extinguishers

22. Every ship of Class III of 21.34 m in length or greater shall be provided with at least one portable fire extinguisher in each of the passenger spaces above the bulkhead deck, and with at least 2 such extinguishers in each of the crew spaces and in each of the passenger spaces below that deck. At least one portable fire extinguisher shall be available for use in any galley.

Machinery spaces of Category A

23. (1) In every ship of Class III of 21.34 m in length or greater there shall be provided for the protection of any machinery space of Category A at least one of the fixed fire extinguishing installations required by Rule 10(1).

(2) In addition to the requirements of paragraph (1) there shall be provided:

- (a) in each boiler room, 2 or more foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers each of at least 16 kilogrammes capacity; the extinguishers shall be sited so as to be readily accessible in the event of fire and shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room or spaces containing any part of the oil fuel installation;
- (b) in each firing space and in each space which contains any part of any oil fuel installation, at least 2 portable fire extinguishers suitable for extinguishing oil fires;
- (c) in each firing space, a receptacle containing at least 0.3 m³ of sand or other dry material suitable for extinguishing oil fires together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.

(3) In addition to the requirements of paragraph (1), there shall be provided in any such space containing internal combustion type machinery:

- (a) one foam fire extinguisher of at least 45 litres capacity or a carbon dioxide fire extinguisher of at least 16 kilogrammes capacity; and
- (b) portable fire extinguishers suitable for extinguishing oil fires, so located that an extinguisher is not more than 10 m walking distance from any point in the space, but in no event less than 2 such extinguishers.

Fire-fighter's outfits

24. Every ship of Class III of 21.34 m in length or greater shall carry one fire-fighter's outfit for each 30.5 m (or part thereof) of the registered length of the ship. Every such outfit shall comply with the requirements of Rule 70.

*Ships of Class III of less than 21.34 metres in length**Rules application to ships of Class III of less than 21.34 metres in length*

25. Rules 18, 19 and 20 shall apply to ships of Class III of less than 21.34 m in length as they apply to ships of Class II(A) of less than 21.34 m in length.

*Ships of Class IV**Rules application to ships of Class IV of 21.34 metres in length or greater*

26. Rules 21, 22 and 23 shall apply to ships of Class IV of 21.34 m in length or greater as they apply to ships of Class III of 21.34 m in length or greater.

Rules application to ships of Class IV of less than 21.34 metres in length

27. Rules 18, 19 and 20 shall apply to ships of Class IV of less than 21.34 m in length as they apply to ships of Class II(A) of less than 21.34 m in length.

*Ships of Class V**Rules application to ships of Class V – Fully-Decked Ships*

28. (1) Rule 26 shall apply to fully-decked ships of Class V of 21.34 m in length or greater as it applies to ships of Class IV of 21.34 m in length or greater.

(2) Rules 18, 19 and 20 shall apply to fully-decked ships of Class V of less than 21.34 m in length as they apply to ships of Class II(A) of less than 21.34 m in length.

Ships of Class V – Not Fully-Decked

29. (1) Every ship of Class V which is not fully-decked shall be provided with:

- (a) receptacle containing an adequate quantity of sand or other dry material suitable for extinguishing oil fires;
- (b) a scoop for distributing the contents of the receptacle; and
- (c) the number of portable foam fire extinguishers shown in the following Table:

Length of Ship	Number of foam extinguishers
Not greater than 9.14 metres	2
Greater than 9.14 metres but not greater than 15.24 metres	3
Greater than 15.24 metres	5

- (d) in the case of a ship of 12.20 m in length or greater, 2 fire buckets and, in the case of a ship of less than 12.20 m in length, one fire bucket, unless the equipment required by paragraph (2) is provided.

(2) Every ship of Class V which is not fully-decked but is decked in way of the machinery spaces shall be provided in a position outside such spaces with a hand pump, a hose with a 10 mm diameter nozzle capable of producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship.

Ships of Class VI

Ships of Class VI – Fully-Decked Ships

30. (1) Rule 26 shall apply to fully-decked ships of Class VI of 21.34 m in length or greater as it applies to ships of Class IV of 21.34 m in length or greater.

(2) Rules 18, 19 and 20 shall apply to fully-decked ships of Class VI of less than 21.34 m in length as they apply to ships of Class II(A) of less than 21.34 m in length.

Ships of Class VI – Not Fully-Decked

31. Rule 29 shall apply to ships of Class VI which are not fully-decked as it applies to ships of Class V which are not fully-decked.

PART 3

FIRE PREVENTION AND FIRE APPLIANCES

Ships other than Passenger Ships and Tankers

Ships of Class VII of 500 tons or greater

Fire pumps, fire mains, water service pipes, hydrants, hoses and nozzles

32. (1) Every ship of Class VII of 500 tons or greater shall be provided with appliances in accordance with this Rule whereby at least 2 jets of water as required by these Rules can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty.

- (2) (a) Every ship of Class VII of 1,000 tons or greater shall be provided with at least 2 fire pumps operated by power. Each pump shall be capable of delivering at least one jet of water simultaneously from each of any 2 fire hydrants, hoses and nozzles provided in the ship and shall comply with the requirements of Rule 61.
- (b) Every ship of Class VII of 500 tons or greater but less than 1,000 tons shall be provided with at least one fire pump operated by power, which shall be capable of delivering at least one jet of water simultaneously from each of any 2 fire hydrants, hoses and

nozzles provided in the ship and shall comply with the requirements of Rule 61, provided that the capacity of the fire pump shall not be less than 25 m³/hour.

- (c) In addition, in every ship of Class VII of 500 tons or greater, where other pumps, such as general service, bilge and ballast, are fitted in a machinery space, arrangements shall be made to ensure that at least one of these pumps, having the capacity and pressure required by Rule 61(5) and Rule 62(2), is capable of providing water to the fire main.
- (3) (a) If in a ship of Class VII of 500 tons or greater a fire in any one compartment could put all the fire pumps out of action, there shall be provided, in a position outside the machinery spaces, an independently driven power operated emergency fire pump and its source of power and sea connection.
 - (b) In every ship of Class VII of 2,000 tons or greater the emergency fire pump shall meet the requirements of Rule 61(10).
 - (c) In every ship of Class VII of 500 tons or greater but less than 2,000 tons, the emergency fire pump shall be capable of delivering at least one jet of water simultaneously from each of any 2 hydrants and hoses through nozzles which shall comply with Rule 63(4)(b) whilst maintaining a pressure of at least 2.1 bar at any hydrant in the ship, provided that for such ships of 1,000 tons or greater the pressure at any hydrant shall not be less than 2.5 bar.
- (4) (a) In every ship of Class VII of 500 tons or greater, there shall be provided a fire main, water service pipes, hydrants, hoses and nozzles which shall comply with the requirements of Rules 62 and 63.
 - (b) (i) Every ship of Class VII of 1,000 tons or greater shall, in addition to any fire hoses provided in the machinery spaces, be provided with at least one fire hose for each 30 m (or part thereof) length of the ship but in no case less than 5 hoses and such hoses shall have a total length of at least 60 per cent of the length of the ship. In addition to such hoses there shall be provided one spare fire hose.
 - (ii) In every ship of Class VII of 500 tons or greater, there shall be provided in ro-ro cargo spaces at least 3 water fog applicators in addition to the nozzles required by these Rules.
 - (iii) In every ro-ro cargo space in a ship of Class VII of 500 tons or greater, the number of hydrants with hoses shall be so arranged that at least 2 jets of water each from a single length of hose not emanating from the same hydrant may reach any part of the space. Such hydrants shall be positioned near the accesses to the protected space.

- (iv) Every ship of Class VII of 500 tons or greater but less than 1,000 tons shall, in addition to any fire hoses provided in the machinery spaces, be provided with at least 2 fire hoses having a total length of at least 60 per cent of the length of the ship and one spare fire hose.
- (c) In every ship of Class VII of 500 tons or greater fitted with oil-fired boilers or internal combustion type propelling machinery, there shall be provided in each space containing such boilers or machinery at least 2 fire hydrants, one on the port side and one on the starboard side, and in addition where there is access to the machinery space of any such ship by way of a shaft tunnel, a fire hydrant shall be provided in the tunnel at the end adjacent to that space. A fire hose and nozzle shall be provided at every such fire hydrant.

Portable fire extinguishers

33. (1) Every ship of Class VII of 500 tons or greater shall be provided with a sufficient number of portable fire extinguishers to ensure that at least one such extinguisher is readily available for use in any part of the accommodation spaces, service spaces and control stations. The number of such extinguishers shall not be less than 5 in a ship of 1,000 tons or greater and not less than 3 in a ship of 500 tons or greater but less than 1,000 tons.

(2) In every ship of Class VII of 500 tons or greater there shall be provided in each ro-ro cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:

- (a) at least 2 portable extinguishers suitable for extinguishing oil fires for every 40 m length of deck space so arranged that at least one extinguisher is available on each side of the space and at least one extinguisher is available at each access to the space; and
- (b) one portable foam applicator unit complying with the requirements of Schedule 6. Not less than 2 such applicators shall be available in the ship for use in any such space.

Fixed fire extinguishing arrangements in cargo spaces

34. (1) In every ship of Class VII engaged in the carriage of dangerous goods there shall be provided:

- (a) for every cargo space (other than ro-ro cargo spaces not capable of being sealed), a fixed gas fire extinguishing system complying with the requirements of Schedule 10; and
 - (b) for every ro-ro cargo space not capable of being sealed, a fixed pressure water spraying system complying with the requirements of Schedule 9.
- (2) (a) In every ship of Class VII of 2,000 tons or greater, other than ships to which paragraph (1) of this Rule applies, there shall be

provided a fixed gas fire extinguishing system complying with the requirements of Schedule 10 for every cargo space.

(b) The Minister may exempt any ship from the requirements of paragraph (2)(a) if:

- (i) the ship is constructed and solely intended for the carriage of ore, coal, grain, unseasoned timber or non-combustible cargoes or cargoes which, in the opinion of the Minister, constitute a low fire risk; and
- (ii) the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

(3) (a) In the case of a ship of Class VII engaged in the carriage of dangerous goods and constructed on or after 1 February 1992 and before 1 July 2002, the Minister may exempt from the requirements of paragraphs (1)(a) and (2)(a) cargo spaces of any ship if constructed and solely intended for carrying ore, coal, grain, unseasoned timber, non-combustible cargoes or cargoes which, in the opinion of the Minister, constitute a low fire risk having regard to IMO Circular MSC.1/Circ.1395 in its updated version. Such exemptions may be granted only if the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces in accordance with the IMSBC Code entry for coal. When such exemptions are granted, the Minister shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned, in accordance with Safety Convention regulation I/12(a) and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

(b) In the case of a ship of Class VII constructed on or after 1 July 1998 and before 1 July 2002, notwithstanding the provisions of paragraph (2)(a), any cargo space in a ship engaged in the carriage of dangerous goods on deck or in cargo spaces shall be provided with a fixed gas fire-extinguishing system complying with Schedule 10 or with a fire-extinguishing system which, in the opinion of the Minister, gives equivalent protection for the cargoes carried having regard to IMO Circular MSC.1/Circ.1395 in its updated version.

(4) In every ship of Class VII of 500 tons or greater there shall be provided for every ro-ro cargo space capable of being sealed and for every cargo space (other than a ro-ro cargo space) intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion a fixed pressure water spraying system complying with Schedule 9 or a fixed gas fire extinguishing system complying with Schedule 10.

(5) In every ship of Class VII of 500 tons or greater there shall be provided for every ro-ro cargo space not capable of being sealed a fixed pressure water spraying system complying with Schedule 9.

(6) Permanent openings in the side plating, the ends or deckhead of open and closed ro-ro cargo spaces shall be so situated that a fire in the cargo space does not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces.

(7) The list of solid bulk cargoes which are non-combustible or constitute a low fire risk shall be determined having regard to IMO Circular MSC.1/Circ.1395 in its updated version.

Special Requirements for cargo space ventilation

35. (1) In every ship of Class VII of 500 tons or greater there shall be provided in each closed ro-ro cargo space and each cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion an effective power ventilation system to provide at least 6 air changes per hour based on an empty hold. Ventilation fans shall where practicable be run continuously whenever vehicles are on board. Where this is impracticable, they shall be operated for a limited period daily as weather permits and in any case for a reasonable period prior to discharge, after which period such spaces shall be proved gas free. One or more portable combustible gas detecting instruments shall be carried for this purpose, the system shall be entirely separate from other ventilating systems. Ventilation ducts serving such spaces capable of being effectively sealed shall be separated for each cargo space. The Minister may require an increased number of air changes when vehicles are being loaded or unloaded. The system shall be capable of being controlled from a position outside such spaces. In addition:

- (a) the ventilation shall be so arranged as to prevent air stratification and the formation of air pockets;
- (b) means shall be provided to indicate any loss of the required ventilating capacity on the navigating bridge;
- (c) arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilating system in case of fire, taking into account the weather and sea conditions.

(2) In every ship of Class VII of 500 tons or greater in each closed ro-ro cargo space carrying motor vehicles with fuel in their tanks for their own propulsion and each cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the electrical equipment of such spaces shall comply with the provisions of Rules 50(1) to 50(4) inclusive of the Cargo Ship Construction Rules 1985.

Machinery spaces of Category A

36. (1) In every ship of Class VII of 500 tons or greater there shall be provided for the protection of any machinery space of Category A at least one of the following fire extinguishing installations:

- (a) a fixed pressure water spraying system complying with the requirements of Schedule 8;

- (b) a fixed gas fire extinguishing system complying with the requirements of Schedule 10.

If the engine and boiler rooms are not entirely separated from each other by a bulkhead, or if fuel oil can drain from the boiler room into the engine room, the combined engine and boiler rooms shall for the purpose of this paragraph be regarded as a single space.

(2) In addition to the requirements of paragraph (1), there shall be provided:

- (a) in each boiler room, one or more foam fire extinguishers each of at least 135 litres capacity or carbon dioxide fire extinguishers each of at least 45 kilogrammes capacity. The extinguishers shall be sited so as to be readily accessible in the event of fire and shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room and spaces containing any part of the oil fuel installation;
- (b) in each boiler room at least one portable foam applicator unit complying with the requirements of Schedule 6;
- (c) in each firing space and in each space which contains any part of any oil fuel installation, at least 2 portable fire extinguishers suitable for extinguishing oil fires, in addition to any which may be carried in compliance with subparagraph (b);
- (d) in each firing space a receptacle containing 0.3 m³ of sand or other dry material suitable for extinguishing oil fires, together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.

(3) In addition to the requirements of paragraph (1) there shall be provided in any such spaces containing internal combustion type machinery:

- (a) one or more foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other areas of high fire risk;
- (b) at least one portable foam applicator unit complying with the requirements of Schedule 6;
- (c) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 m walking distance from any position within the space; provided that there shall be not less than 2 extinguishers.

Machinery spaces containing steam turbines or enclosed steam engines

37. In every ship of Class VII of 500 tons or greater, there shall be provided in spaces containing steam turbines or enclosed pressure lubricated steam engines used either for main propulsion, or having in the aggregate power of not less than 375 kW for auxiliary purposes:

- (a) foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers each of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the pressure lubrication system and on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing and any other areas of high fire risk; provided that such extinguishers shall not be required if equivalent protection is provided in such spaces by a fixed fire extinguishing system fitted in compliance with Rule 36(1);
- (b) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 m walking distance from any position within the space provided that there shall be not less than 2 extinguishers; and
- (c) where such spaces are to be periodically unattended there shall be provided additionally either a fixed pressure water spraying system complying with the requirements of Schedule 8 or a fixed gas fire extinguishing system complying with the requirements of Schedule 10.

Fire extinguishing appliances in other machinery spaces

38. Where a fire hazard exists in any machinery space for which no specific provisions for fire extinguishing are made in Rules 36 and 37, there shall be provided in or adjacent to that space, a sufficient number of portable fire extinguishers to ensure that at least one extinguisher is not more than 10 m walking distance from any position within that space unless equivalent means of fire extinction are provided.

Fire detection and fire alarm systems and sample extraction smoke detection system

39. (1) Every ship of Class VII of 500 tons or greater shall be provided with a fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 11 in any machinery space where:

- (a) the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; or
 - (b) the main propulsion and associated machinery including sources of main electrical supply are provided with some automatic or remote control and are under continuous manned supervision from a control room.
- (2) (a) In every ship of Class VII of 500 tons or greater there shall be provided in each ro-ro cargo space a fixed fire detection and fire alarm system of an approved type complying with Schedule 11.

- (b) In the case of a ship of 500 tons or greater of Class VII constructed on or after 1 February 1992, the fixed fire detection system referred to in subparagraph (a) shall be capable of rapidly detecting the onset of fire. The type of detectors and their spacing and location shall be to the satisfaction of the Minister taking into account the effects of ventilation and other relevant factors. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Minister.

(3) In every ship of Class VII of 500 tons or greater there shall be provided in each cargo space (other than ro-ro cargo space) intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion either a fixed fire detection and fire alarm system of an approved type complying with Schedule 11 or a sample extraction smoke detection system complying with Schedule 12, except that Rule 32(4)(b)(ii) and Rule 33(2) are not required to be complied with.

Fire-fighter's outfits

40. (1) Every ship of Class VII of 500 tons or greater shall carry fire-fighter's outfits which shall comply with the requirements of Rule 70 in accordance with the following scale:

Tonnage of the ship	Number of outfits
500 but less than 2,500	2
2,500 but less than 4,000	3
4,000 and greater	4

(2) One such outfit carried in any ship of Class VII of 500 tons or greater shall include a breathing apparatus of the air hose type and the remainder of the outfits shall include breathing apparatus of the self-contained type provided that where the air-hose of an air-hose type breathing apparatus has, in order to comply with paragraph 1 of Schedule 5, to exceed 36 m in length, a self-contained breathing apparatus shall be provided either in addition to or as a substitute for that air-hose breathing apparatus.

International Shore Connection

41. Every ship of Class VII of 500 tons or greater shall be provided with at least one international shore connection which shall comply with the requirements of Schedule 1 to enable water to be supplied from another ship or from the shore, to the fire main. Fixed provision shall be made to enable such a connection to be used on the port side and on the starboard side of the ship.

Ships of Class VII of less than 500 tons

Ships of Class VII of less than 500 tons

42. (1) This Rule applies to ships of Class VII of less than 500 tons.

- (2) (a) Every ship to which this Rule applies shall be provided with appliances in accordance with this Rule whereby at least one jet of water as required by these Rules can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty.
 - (b) Every ship to which this Rule applies shall be provided with at least one fire pump operated by power which shall be capable of delivering at least one jet of water from any fire hydrant hose and nozzle provided in the ship, and which shall comply with the requirements of Rule 61.
 - (c) In every ship to which this Rule applies fitted with oil-fired boilers or internal combustion type propulsion machinery, there shall be provided in a position outside the spaces containing such boilers or machinery an additional fire pump and its source of power and sea connection. If such a pump is operated by power, it shall comply with the requirements of subparagraph (b), and if it is manually operated, it shall be provided with a hose and a 10 mm nozzle through which it shall be capable of producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship.
 - (d) In every ship to which this Rule applies there shall be provided a fire main, water service pipes and hydrants which shall comply with the requirements of Rule 62 and at least 3 fire hoses and nozzles which shall comply with Rule 63.
- (3) Every ship to which this Rule applies shall be provided with at least 3 portable fire extinguishers so situated as to be readily available for use in the accommodation and service spaces.
- (4) In every ship to which this Rule applies, there shall be provided for the protection of any space containing any oil-fired boiler, oil fuel settling tank or oil fuel unit, at least one of the fire extinguishing systems referred to in Rule 36(1).
- (5) In addition to the requirements of paragraph (4), there shall be provided:
- (a) in each boiler room and in each space which contains any part of any oil fuel installation, at least 2 portable fire extinguishers suitable for extinguishing oil fires;
 - (b) in each firing space, a receptacle containing at least 0.3m³ of sand or other dry material suitable for extinguishing oil fires, together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.
- (6) In every ship to which this Rule applies there shall be provided in any space containing internal combustion type machinery either:
- (a) one portable fire extinguisher suitable for extinguishing oil fires for each 74.6 kilowatts or part thereof of such machinery provided that no more than 7 such extinguishers shall be required in any one space; or

- (b) two portable extinguishers suitable for extinguishing oil fires together with either:
 - (i) one foam fire extinguisher of at least 45 litres capacity; or
 - (ii) one carbon dioxide fire extinguisher of at least 16 kilogrammes capacity.

(7) Every ship to which this Rule applies shall be provided with at least one fire-fighter's outfit which shall comply with the requirements of Rule 70 and which shall contain a breathing apparatus of the air-hose type.

Ships of Class VIII

Ships of Class VIII of 500 tons or greater

43. Rules 32 to 41 inclusive shall apply to ships of Class VIII of 500 tons or greater as they apply to ships of Class VII of 500 tons or greater.

Ships of Class VIII of 150 tons or greater but less than 500 tons

44. Rule 42 shall apply to ships of Class VIII of 150 tons or greater but less than 500 tons as it applies to ships of Class VII of less than 500 tons.

Ships of Class VIII of less than 150 tons

45. (1) This Rule applies to ships of Class VIII of less than 150 tons.

(2) (a) Rule 42(2) shall apply to every ship to which this Rule applies of 21.34 m in length or greater, as it applies to ships of Class VII of less than 500 tons except that the fire pump required by Rule 42(2)(b) may be driven by the main engine.

(b) Every ship to which this Rule applies of less than 21.34 m in length shall be provided in a position outside the machinery spaces with either a power or a hand operated pump with a permanent sea connection, a hose with a 10 mm diameter nozzle capable of producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship, and in addition a spray nozzle suitable for use with the hose, provided that in any ship of less than 9 m in length or in any open ship of less than 21.34 m, 2 fire buckets, one of which shall be fitted with a lanyard, may be substituted for such equipment but such buckets shall not be required in addition to buckets provided in compliance with paragraph (3).

(3) Every ship to which this Rule applies shall be provided with portable fire extinguishers or with fire buckets in accordance with the following Table A:

Table A

Length of Ship	Minimum number of Extinguishers or Buckets
Under 21.34 m	2
21.34 m or greater	3

When fire buckets are provided, at least one shall be fitted with a lanyard.

(4) In addition to the requirements of paragraph (3), every ship to which this Rule applies which is fitted with oil-fired boilers or internal combustion type propulsion machinery shall be provided with portable fire extinguishers suitable for extinguishing oil fires in accordance with the following Table B:

Table B

Length of Ship	Minimum number of Extinguishers
Under 6 m	1
6 m or greater	2

(5) Every ship to which this Rule applies of 9 m in length or greater which is fitted with oil-fired boilers or internal combustion type propulsion machinery shall, if it is mainly or wholly constructed of wood and is decked in way of the machinery space, be provided with means outside the machinery space for rapidly injecting into the machinery space a quantity of fire smothering gas equivalent to at least 60 per cent of the gross volume of that space, or where the machinery space is bounded by steel bulkheads, equivalent to at least 40 per cent of the gross volume of the space; provided that in any ship to which this Rule applies of less than 21.34 m in length, there may be substituted a water spraying system supplied from a hand pump and a permanent sea connection situated outside the machinery space which may be the hand pump and the sea connection referred to in paragraph (2)(b). Such pump shall be connected by fixed piping to a sufficient number of water spraying nozzles suitably sited in the machinery space and capable of extinguishing oil fires.

(6) Every ship to which this Rule applies being a fully-decked ship of 21.34 m in length or greater shall be provided with a fire-fighter's axe.

Ships of Class VIII(A), IX and IX(A)

Ships of Class VIII(A), IX and IX(A)

46. (1) Rules 43, 44 and 45 shall apply to ships of Class VIII(A), IX and IX(A) as they apply to ships of Class VIII.

(2) The Minister may exempt any ship of Class VIII(A) or IX(A) and any ship of Class IX which is less than 500 tons or which is not engaged on an international voyage from any of the requirements of these Rules.

*Ships of Class XI**Ships of Class XI*

47. (1) Rules 43, 44 and 45 shall apply to ships of Class XI as they apply to ships of Class VIII.

(2) The Minister may exempt a ship of Class XI from any of the requirements of these Rules.

*Ships of Class XII**Ships of Class XII*

48. (1) Rules 43 and 44 shall apply to ships of Class XII of 150 tons or greater as they apply to ships of Class VIII of 150 tons or greater.

- (2) (a) Every ship of Class XII of less than 150 tons and of 21.34 m in length or greater shall be provided with appliances in accordance with this Rule whereby at least one jet of water as required by these Rules can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty;
- (b) Every ship of Class XII of less than 150 tons and of 21.34 m in length or greater shall be provided with at least one fire pump operated by power which may be driven by the main engine and which shall be capable of delivering at least one jet of water from any fire hydrant, hose and nozzle provided in the ship and which shall comply with the requirements of Rule 61;
- (c) In every ship of Class XII of less than 150 tons and of 21.34 m in length or greater fitted with oil-fired boilers or internal combustion type propulsion machinery, if the pump required by subparagraph (b) and its source of power and sea connection are not situated outside spaces containing such boilers or machinery, there shall be provided in a position outside such spaces an additional fire pump and its source of power and sea connection. If such an additional pump is operated by power, it shall comply with the requirements of subparagraph (b) and if it is manually operated it shall be provided with a hose and a 10 mm diameter nozzle through which it shall be capable of producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship;
- (d) In every ship of Class XII of less than 150 tons and of 21.34 m in length or greater there shall be provided a fire main, water service pipes and hydrants which shall comply with the requirements of Rule 62, and at least 2 fire hoses.
- (3) Every ship of Class XII of less than 150 tons and of less than 21.34 m in length shall be provided in a position outside the machinery spaces with either a power or a hand operated pump with a permanent sea connection, a hose with a nozzle at least 6 mm in diameter producing a jet of water having a throw of not less than 6 m which can be directed on to any part of the ship, and in addition a

spray nozzle suitable for use with the hose, provided that in any such ship of less than 15 m in length and in any open ship of less than 21.34 m in length, 2 fire buckets, one of which shall be fitted with a lanyard, may be substituted for such equipment but such buckets shall not be required in addition to buckets provided in compliance with paragraph (4).

(4) Every ship of Class XII of less than 150 tons shall be provided with portable fire extinguishers or with fire buckets in accordance with the following Table A:

Table A

Length of Ship	Minimum number of Extinguishers or Buckets
Less than 21.34 m	2
21.34 m or greater	3

When fire buckets are provided, at least one shall be fitted with a lanyard.

(5) In addition to the requirements of paragraph (4), every ship of Class XII of less than 150 tons which is fitted with oil-fired boilers or internal combustion type propelling machinery shall be provided with 2 portable fire extinguishers suitable for extinguishing oil fires.

(6) Every ship of Class XII of less than 150 tons being a fully decked ship of 21.34 m in length or greater shall be provided with a fire-fighter's axe.

(7) The Minister may exempt a ship of Class XII from any of the requirements of these Rules.

PART 4

FIRE PREVENTION AND FIRE APPLIANCES

Tankers

Tankers of Class VII(T) of 500 tons or greater

General requirements

49. Rules 32 and 33(1), Rules 36 to 39(1) inclusive and Rule 41 shall apply to every tanker of Class VII(T) of 500 tons or greater as they apply to ships of Class VII of 500 tons or greater.

Cargo tank protection

50. (1) Every tanker of Class VII(T) of 500 tons or greater shall be provided with a fixed deck foam system complying with the requirements of Schedule 13 except that this requirement shall not apply to chemical tankers having a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk or to gas carriers having a valid Certificate of Fitness for the Carriage of Liquefied Gases in Bulk.

(2) Subject to paragraph (3), every tanker of Class VII(T) of 20,000 tonnes deadweight or greater constructed or adapted and used to carry crude oil and petroleum products having a closed flash point not exceeding 60°C, the Reid vapour pressure of which is below that of atmospheric pressure, and other liquids having a similar fire hazard, shall be provided with an inert gas system complying with the requirements of Schedule 14.

(3) The requirements for inert gas systems of this Rule shall not be applied to:

- (a) a chemical tanker constructed before, on or after 1 July 1986 when carrying cargoes described in paragraph (2), provided that it has a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, or
 - (b) a chemical tanker constructed before 1 July 1986, when carrying crude oil or petroleum products, provided that it has a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, or
 - (c) a gas carrier constructed before, on or after 1 July 1986 when carrying cargoes described in paragraph (2), provided that it is fitted with cargo tank inerting arrangements equivalent to those specified in subparagraph (a) or (b); or
 - (d) a chemical tanker and a gas carrier when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in chapters VI and VII of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk or chapters 17 and 18 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk:
 - (i) if constructed before 1 July 1986; or
 - (ii) if constructed on or after 1 July 1986, provided that the capacity of tanks used for their carriage does not exceed 3,000 m³ and the individual nozzle capacities of tank washing machines do not exceed 17.5 m³/h and the total combined throughput from the number of machines in use in a cargo tank at any one time does not exceed 110 m/h.
- (4) (a) Every inert gas system provided in accordance with this Rule shall be designed, constructed and tested to the satisfaction of the Minister. It shall be designed and operated so as to render and keep the atmosphere of the cargo tanks including the slop tanks non-flammable at all times, except where such tanks are to be gas free.
- (b) In the event that the inert gas system is unable to meet the operational requirement set out in subparagraph (a) and it has been assessed that it is impractical to effect a repair, then cargo discharge, deballasting and necessary tank cleaning may only be

resumed when the "emergency procedures" laid down in the Guidelines for Inert Gas Systems are complied with.

(5) Combination carriers constructed before, on or after 1 July 2002 shall not carry cargoes other than oil unless all cargo spaces are empty of crude oil and other petroleum products having a closed flash point not exceeding 60°C and other liquids having a similar fire hazard and are gas freed unless the arrangements provided in each case are to the satisfaction of the Minister and in accordance with the relevant operational requirements contained in the IMO Guidelines for Inert Gas Systems.

(6) (a) Every tanker of Class VII(T) of less than 20,000 tonnes deadweight operating with a tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with Schedule 14.

(b) Every tanker of Class VII(T) operating with a tank cleaning procedure using crude oil washing shall be provided with fixed tank washing machines only.

(7) Every tanker of Class VII(T) fitted with a fixed inert gas system shall be provided with a closed ullage system.

(8) (a) Other fixed fire extinguishing systems may be provided in place of those required by the foregoing provisions of these Rules if each system is deemed to be equivalent to the said systems in the manner set out in subparagraph (b) and (c) of this paragraph;

(b) A system provided in place of the inert gas system referred to in these Rules shall be deemed to be equivalent to that system for the purpose of these Rules if it is:

(i) capable of preventing dangerous accumulation of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations, and

(ii) so designed as to minimise the risk of ignition from the generation of static electricity by the system itself;

(c) An installation provided in place of the fixed deck foam system referred to in these Rules shall be deemed to be equivalent to that system for the purpose of these Rules if it is:

(i) capable of extinguishing spill fires and precludes ignition of spilled oil not yet ignited; and

(ii) capable of combating fires in ruptured tanks.

(9) Where a liquid cargo (other than one of those referred to in paragraph (2)) which presents particular fire hazards is intended to be carried, a means or system of fire extinguishing appropriate to the cargo to be carried shall be provided to the satisfaction of the Minister.

Cargo tank purging, gas freeing and gas measurement

51. (1) In a tanker of Class VII(T) of 500 tons or greater arrangements for purging or gas freeing shall be such as to minimise the hazards due to the dispersal of the flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

(2) Subject to paragraph (4)(a)(i), when a ship is provided with an inert gas system the cargo tanks shall first be purged in accordance with paragraph 13 of Schedule 14 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2 per cent by volume. Thereafter, venting may be at the cargo tank deck level.

(3) Subject to paragraph (4)(a)(ii), when a ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged:

- (a) through the vent outlets as specified in Rule 12 of the Cargo Ship Construction Rules 1985; or
 - (b) with a vertical exit velocity of at least 20 m/sec through outlets at least 2 m above the cargo tank deck level and through devices (other than flame screens) complying with the First Schedule to the Cargo Ship Construction Rules 1985 so as to prevent the passage of flame into the cargo tanks, until the flammable vapour concentration in the outlet has been reduced to 30 per cent of the lower flammable limit. Thereafter the discharge of the vapour mixture may be at the cargo tank deck level.
- (4) (a) In the case of a ship of Class VII(T) of 500 tons or greater constructed on or after 1 February 1992:
- (i) when the ship is provided with an inert gas system, the cargo tanks shall first be purged in accordance with paragraph 13 of Schedule 14 until the concentration of hydrocarbon vapours in the cargo tank has been reduced to less than 2 per cent by volume. Thereafter, gas-freeing may take place at the cargo tank deck level;
 - (ii) when the ship is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged initially:
 - (I) through the vent outlets as specified in Rule 12 of the Cargo Ship Construction Rules 1985; or
 - (II) through outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 30 m/sec maintained during the gas-freeing operation; or
 - (III) through outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 20 m/sec and through devices (other than flame screens) complying with the First Schedule to the Cargo Ship Construction Rules 1985 so as to prevent the passage of flame into the cargo tanks;

- (iii) when the flammable vapour concentration at the outlet has been reduced to 30 per cent of the lower flammable limit, gas-freeing may thereafter be continued at cargo tank deck level.
- (5) (a) This paragraph shall apply to an oil tanker of 500 tons or greater of Class VII(T) constructed on or after 1 October 1994 designed and constructed or adapted for the carriage of liquid cargoes of a flammable nature.
- (b) Double hull and double bottom spaces shall be fitted with suitable connections for the supply of air.
 - (c) On a tanker required to be fitted with inert gas systems:
 - (i) double hull spaces shall be fitted with suitable connections for the supply of inert gas;
 - (ii) where such spaces are connected to a permanently fitted inert gas distribution system, means shall be provided to prevent hydrocarbon gases from the cargo tanks entering the double hull spaces through the system;
 - (iii) where such spaces are not permanently connected to an inert gas distribution system, appropriate means shall be provided to allow connection to the inert gas main.
 - (d) Suitable portable instruments for measuring oxygen and flammable vapour concentrations shall be provided. In selecting these instruments, due attention shall be given for their use in combination with the fixed gas sampling line systems referred to in subparagraph (e).
 - (e) Where atmosphere in double hull spaces cannot be reliably measured using flexible gas sampling hoses, such spaces shall be fitted with permanent gas sampling lines. The configuration of such line systems shall be adapted to the design of such spaces.
 - (f) The materials of construction and the dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they should be electrically conductive.

(6) All tankers shall be equipped with at least one portable instrument for measuring oxygen and one portable instrument for measuring flammable vapour concentrations, together with a sufficient set of spares. Suitable means shall be provided for the calibration of such instruments.

Cargo pump rooms

52. (1) Except as otherwise provided in paragraph (2), in every tanker of Class VII(T) of 500 tons or greater, each cargo pump room and each pump room having a similar hazard shall be provided with at least one of the fixed fire extinguishing systems required by Rule 36(1) and which shall be operated from a readily accessible position outside the pump room, provided that where the fixed extinguishing system is a gas system:

- (a) the alarms referred to in Schedule 10 shall be safe for use in a flammable cargo vapour/air mixture;
- (b) a notice shall be exhibited at the controls stating that due to the electrostatic ignition hazard, the system is to be used only for fire extinguishing and not for inerting purposes;
- (c) where the extinguishing medium used in the cargo pump room system is also used in systems serving other spaces, the quantity of medium provided or its delivery rate need not be more than the maximum required for the largest compartment.

(2) In a chemical tanker having a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, where the fixed fire extinguishing system referred to in paragraph (1) is a gas system, the concentration shall be as specified in the Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk.

Fire main isolating valves

53. In every tanker of Class VII(T) of 500 tons or greater isolation valves shall be fitted in the fire main at poop front in a protected position and on the tank deck at intervals of not more than 40 m to preserve the integrity of the fire main system in case of fire or explosion.

Fire-fighter's outfits

54. In every ship of Class VII(T) of 500 tons or greater there shall be provided not less than 4 fire-fighter's outfits complying with the requirements of Rule 70. In addition, one such outfit carried in any such ship shall include a breathing apparatus of the air-hose type and the remainder shall include breathing apparatus of the self-contained type, provided that where the air-hose type breathing apparatus has, in order to comply with paragraph 1 of Schedule 5, to exceed 36 m in length, a self-contained breathing apparatus shall be provided either in addition to or as a substitute for that air-hose breathing apparatus.

Tankers of Class VII(T) of less than 500 tons

Rules application to tankers of Class VII(T) of less than 500 tons

55. (1) Rule 42 shall apply to every tanker of Class VII(T) of less than 500 tons as it applies to ships of Class VII of less than 500 tons. In addition, Rules 51 and 52 shall apply to such tankers as they apply to tankers of Class VII(T) of 500 tons or greater.

(2) In addition to the requirements of paragraph (1), every tanker of Class VII(T) of less than 500 tons shall be provided with at least one mobile foam appliance whereby foam is immediately available by simple and rapid means of operation for discharge in the area of the cargo manifolds.

Tankers of Class VIII(T)

Rules application to tankers of Class VIII(T) of 500 tons or greater

56. Rules 49 to 54 inclusive shall apply to tankers of Class VIII(T) of 500 tons or greater as they apply to tankers of Class VII(T) of 500 tons or greater.

Rules application to tankers of Class VIII(T) of 150 tons or greater but less than 500 tons

57. Rule 44 shall apply to tankers of Class VIII(T) of 150 tons or greater but less than 500 tons as it applies to ships of Class VIII of 150 tons or greater but less than 500 tons. In addition, Rules 51, 52 and 55(2) shall apply to tankers of Class VIII(T) as they apply to tankers of Class VII(T) of less than 500 tons.

Rules application to tankers of Class VIII(T) of less than 150 tons

58. Rule 45 shall apply to tankers of Class VIII(T) of less than 150 tons as it applies to ships of Class VIII of less than 150 tons. In addition, a mobile foam appliance shall be provided in accordance with Rule 55(2).

Tankers of Class VIII(A)(T) and Class IX(A)(T)

Rules application to tankers of Class VIII(A)(T) and Class IX(A)(T)

59.(1)(a) Rule 40 shall apply to tankers of Class VIII(A)(T) and Class IX(A)(T) of 500 tons or greater as it applies to ships of Class VII of 500 tons or greater.

(b) Rules 49 to 53 inclusive shall apply to tankers of Class VIII(A)(T) and Class IX(A)(T) of 500 tons or greater as they apply to tankers of Class VII(T) of 500 tons or greater, provided that tankers of Class VIII(A)(T) and Class IX(A)(T) of less than 2,000 tons may instead of complying with Rule 50(1) comply with Rule 55(2).

(2) Rules 57 and 58 shall apply to tankers of Class VIII(A)(T) and Class IX(A)(T) as they apply to tankers of Class VIII(T).

(3) The Minister may exempt any tanker of Class VIII(A)(T) or Class IX(A)(T) which is less than 500 tons or which is not engaged on an international voyage from any of the requirements of these Rules.

PART 5

FIRE PREVENTION AND FIRE APPLIANCES

General

Requirements for ships provided with helicopter landing with or without fuelling facilities

60. (1) On any helicopter deck there shall be provided and stored adjacent to the means of access to that deck;

- (a) dry powder extinguishers of total capacity not less than 45 kilogrammes; and
- (b) a suitable foam applicator system consisting of monitors or foam making branch pipes capable of delivering foam solution at a rate of not less than 6 litres per minute per square metre of the area contained within a circle of diameter D metres for not less than 5 minutes. For the purpose of this Rule, D is the distance across the main rotor and tail rotor in the fore and aft line of a helicopter with a single main rotor and across both rotors for a tandem rotor helicopter; and
- (c) carbon dioxide extinguishers of total capacity of not less than 16 kilogrammes, which shall be so equipped as to enable the medium to be applied to the engine area of any helicopter using the deck.

(2) The arrangement of water service pipes, hydrants, hoses and nozzles required by these Rules for fire purposes shall be such that at least 2 jets of water can reach any part of the helicopter deck and, where helicopter refuelling facilities are provided, any part of the fuel storage tanks and associated pumps and piping.

(3) In every ship provided with helicopter refuelling facilities at least 2 portable extinguishers suitable for fighting oil fires shall be provided adjacent to the fuel storage tanks and associated pumps and piping in addition to any portable extinguishers required in these Rules.

Fire pumps

61. (1) In every passenger ship to which these Rules apply which is required by these Rules to be provided with fire pumps operated by power, such fire pumps (other than any emergency fire pumps) shall together be capable of delivering for fire fighting purposes a quantity of water under the conditions and at the pressure specified in Rule 62 of not less than two thirds of the quantity required to be dealt with by the bilge pumps provided in the ship in compliance with Part III of the Passenger Ship Construction Rules 1985.

(2) In every ship, other than a passenger ship, to which these Rules apply which is required by these Rules to be provided with fire pumps operated by power, such fire pumps (other than any emergency fire pumps) shall together be capable of delivering for fire fighting purposes a quantity of water under the conditions and at the pressure specified in Rule 62, which shall not be less than the quantity obtained from the following formula;

Quantity of water in $m^3/\text{hour}/Cd^2$ where:

- (a) $C=5$ for ships required to be provided with more than one fire pump (excluding any emergency fire pump) and $C=2.5$ for ships required to be provided with only one fire pump, and
- (b) $d=1 + 0.066 VL(B+D)$ to the nearest 0.25

where

L = length of the ship in metres on the summer load water line from the foreside of the stem to the afterside of the rudder post. Where there is no rudder post, the length is measured from the foreside of the stem to the axis of the rudder stock. For ships with cruiser sterns, the length shall be taken as 96 per cent of the total length on the designated summer load water line or as the length from the foreside of the stem to the axis of the rudder stock if that be the greater;

B = greatest moulded breadth of the ship in metres; and

D = moulded depth of the ship in metres measured to the bulkhead deck amidships;

provided that in any such ship the total capacity of the fire pumps for fire-fighting purposes shall not be required to exceed 180 m³/hour.

(3) Every fire pump required by these Rules to be operated by power shall, except as expressly provided otherwise in these Rules, be operated by means other than the ship's main engines. Fire pumps provided in compliance with these Rules may be sanitary, ballast, bilge or general service pumps provided that they are not normally used for pumping oil and, if they are subject to occasional duty for the transfer or pumping of oil, suitable change-over arrangements are fitted and operating instructions are conspicuously displayed at the change-over position.

(4) In every ship to which these Rules apply in which automatic and remote control systems have been provided in the machinery space in lieu of continuous manning of the space, arrangements shall be made to ensure immediate availability of a water supply from the fire main at the required pressure either by permanent pressurisation or by suitably placed remote starting of the fire pumps. The Minister may waive this requirement for ships other than passenger ships of less than 1,600 tons if the arrangement of the machinery space access makes it unnecessary.

(5) In every ship to which these Rules apply which is required by these Rules to be provided with more than one fire pump operated by power (other than any emergency pump) every such fire pump shall have a capacity of not less than 80 per cent of the total capacity of the fire pumps required by paragraph (1) divided by the number of fire pumps required by these Rules to be provided in the ship provided that each pump has a capacity of not less than 25 m³/hour. When more fire pumps operated by power than are required by those Rules are provided in any ship, the Minister may permit the capacity of any such additional fire pumps to be less than 80 per cent.

(6) Every fire pump required by these Rules which is operated by power (other than any emergency pump) shall be capable of producing from any fire hydrant or hydrants in the ship, at least the minimum number of jets of water required by these Rules as appropriate to the class and tonnage of the ship, while maintaining the pressure required by Rule 62(2).

(7) Relief valves shall be provided in conjunction with all fire pumps referred to in this Rule if the pumps are capable of developing a pressure exceeding the design pressure of the fire main, water service pipes, hydrants and

hoses. Such valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

(8) Every centrifugal pump which is connected to the fire main shall be fitted with a non-return valve.

(9) In every passenger ship any emergency fire pump shall be situated in a position aft of the ship's collision bulkhead.

(10) For every ship of 2,000 tons or greater, other than a passenger ship, the arrangements of the emergency fire pump shall be such that:

- (a) the capacity of the emergency fire pump shall not be less than 40 per cent of the total capacity of the fire pumps required by this Rule and in any case not less than 25 m³/hour whilst maintaining at any hydrant the minimum pressures prescribed in Rule 62(2)(b);
- (b) any diesel driven power source for the emergency fire pump shall be capable of being readily started in its cold condition down to a temperature of 0°C by hand cranking. Where lower temperatures are likely to be encountered, heating arrangements acceptable to the Minister shall be provided. Where hand cranking is impractical alternative arrangements other than by hand shall be such as to enable the diesel driven power source to be started at least 6 times within a period of 30 minutes, and at least twice within the first 10 minutes;
- (c) any service fuel tank for the diesel driven power source referred to in subparagraph (b) shall contain sufficient fuel to enable the emergency fire pump to run on full load for at least 3 hours and sufficient reserve of fuel shall be available outside the main machinery space to enable such pump to be run on full load for an additional 15 hours;
- (d)
 - (i) the total suction head of the emergency fire pump shall not exceed 4.5 m under all conditions of list and trim likely to be encountered in service and the suction piping shall be designed to minimise suction losses.
 - (ii) In the case of a ship of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 February 1992, the total suction head and the net positive suction head of the pump shall be such that the requirements of subparagraph (a) and Rule 62(2)(b) shall be obtained under all conditions of list, trim, roll and pitch likely to be encountered in service;
- (e)
 - (i) subject to clause (ii), the boundaries of the space containing the emergency fire pump shall be insulated to a standard of structural fire protection equivalent to that required for a control station in Rule 125 or Rule 141.
 - (ii) In the case of a ship of Class VII, Class VIII, Class VII(T) and Class VIII(T) constructed on or after 1 October 1994, the space containing the fire pump shall not be contiguous

to the boundaries of machinery spaces of category A or those spaces containing main fire pumps. Where this is not practicable, the common bulkhead between the 2 spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station in Rule 125 or Rule 141;

- (f) direct access shall not be permitted between the machinery space and the space containing the emergency fire pump and its source of power except where the access is by means of an airlock with each of the 2 doors being self-closing or through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In cases where such access by means of an airlock is provided, a second means of access to the space containing the emergency fire pump and its source of power shall be provided;
- (g) ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to prevent the possibility of smoke from a machinery space fire entering or being drawn into that space.

Fire main, water service pipes and hydrants

62. (1) In every ship which is required by these Rules to be provided with fire pumps operated by power, the diameter of the fire main and of the water service pipes connecting the hydrants thereto shall be sufficient for the effective distribution of the maximum discharge required by these Rules from:

- (a) where only one pump is required by the Rules, that pump, or
- (b) where 2 such pumps are so required, both pumps operating simultaneously, or
- (c) where more than 2 such pumps are so required, the two largest of such pumps operating simultaneously;

provided that in any ship other than a passenger ship the diameter of the fire main and of the water service pipes shall be required to be sufficient only for the discharge of 140 m³/hour.

(2) Any fire pump required to be provided by these Rules shall, when discharging the quantity of water required by paragraph (1) through adjacent fire hydrants in any part of the ship from nozzles of sizes specified in Rule 63, be capable of maintaining the following minimum pressure at any hydrant:

- (a) in any passenger ship -
 - (i) of 4,000 tons and greater:
0.31 N/mm² and, in a ship constructed on or after 1 October 1994, 0.4 N/mm²,
 - (ii) of 1,000 tons and greater but less than 4,000 tons:

- 0.27 N/mm² and, in a ship constructed on or after 1 October 1994, 0.3 N/mm²,
- (iii) of less than 1,000 tons:
0.21 N/mm² and, in a ship constructed on or after 1 October 1994, 0.3 N/mm²;
- (b) in any ship other than a passenger ship -
- (i) of 6,000 tons and greater:
0.27 N/mm²,
- (ii) of 1,000 tons and greater but less than 6,000 tons:
0.25 N/mm²,
- (iii) of less than 1,000 tons:
0.21 N/mm²,

provided that the maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

- (3) (a) Where any ship is required by these Rules to be provided with appliances capable of producing 2 jets of water under the conditions required by these Rules, hydrants sufficient in number shall be so positioned as to enable at least 2 jets of water, not emanating from the same hydrant, one of which shall be from a single length of hose, to reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and to any store room and any part of any cargo space when empty, except that in any special category space or ro-ro cargo space 2 jets shall reach any part of the space, each from a single length of hose. Such hydrants shall be positioned near the accesses to the protected spaces.
- (b) Where any ship is required by these Rules to be provided with appliances capable of producing one jet of water under the conditions required by these Rules, hydrants sufficient in number shall be so positioned as to enable one jet of water from a single length of hose to reach any part of the ship normally accessible to the passenger or crew while the ship is being navigated and any store room and any part of any cargo space when empty.
- (4) (a) The fire main shall have no connections other than those necessary for fire fighting and washing down.
- (b) Materials readily rendered ineffective by heat shall not be used for fire mains unless adequately protected.
- (c) The fire hydrants shall be so placed that the fire hoses may be easily coupled to them.
- (d) In ships which may carry deck cargo the fire hydrants shall be so placed that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.

- (e) Unless there is provided one fire hose and nozzle for each fire hydrant in the ship there shall be complete interchangeability of fire hose couplings and nozzles.
- (f) Hydrant valves of the screw lift type or cocks shall be fitted in such position that any of the fire hoses may be isolated and removed while the fire pumps are at work.
- (g) The water pipes shall not be made of cast iron, and if made of iron or steel shall be galvanised or alternatively the pipes wall thickness shall be increased by a corrosion allowance satisfactory to the Minister.
- (h) The arrangements of pipes and hydrants shall be such as to avoid the possibility of freezing.
- (i) Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in a position outside the machinery spaces which shall be easily accessible when there is a fire. The fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred to above, can be supplied with water by a fire pump not located in this machinery space through pipes which do not enter this space. Exceptionally, the Minister may permit short lengths of the emergency fire pump suction and discharge piping to penetrate the machinery space if it is impracticable to route it externally, provided that the integrity of the fire main is maintained by the enclosure of the piping in a substantial steel casing.

Fire hoses, nozzles, etc.

63. (1)(a) Fire hoses provided in compliance with these Rules shall not exceed 18 m in length except that in ships having a moulded breadth of 27 m or more, the length of fire hoses for exterior locations and for cargo spaces may exceed 18 m but shall not exceed 27 m in length. Such hoses shall be made of closely woven flax, canvas or other suitable material and shall be provided with couplings, branch pipes, other necessary fittings and nozzles, as required by these Rules.
- (b) In a ship of Class I or Class II and a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 February 1992, the fire hoses shall be of non-perishable material as described in BS EN 14540 (Fire-fighting hoses. Non-percolating layflat hoses for fixed systems.).
 - (c) When the fire hoses are replaced in a ship constructed before 1 February 1992 of Class I or Class II or of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T), the provisions of subparagraph (b) shall be complied with.

(2) Every fire hose provided in compliance with these Rules, together with the tools and fittings necessary for its use, shall be kept in a conspicuous position near the hydrants or connections with which it is intended to be used. In interior locations in passenger ships, fire hoses shall be connected to the hydrants at all times. Hose diameters shall be not less than 64 mm if unlined or 45 mm if lined except that the Minister may permit smaller diameter hoses in small ships.

(3) Except in a partially decked ship of Class V, and in a ship of Class XII, fire hoses provided in compliance with these Rules shall not be used for any purpose other than for fire fighting or testing the fire appliances.

- (4) (a) Every ship which is required by these Rules to be provided with fire pumps operated by power shall be provided with nozzles of 12 mm, 16 mm, 19 mm in diameter or as near thereto in diameter as possible. Nozzles larger in diameter may be provided if the requirements of these Rules relating to the provision of water for fire fighting purposes are otherwise complied with.
- (b) For machinery spaces and exterior locations the diameter of the nozzles shall be such as to obtain the maximum possible discharge from the minimum number of jets of water and at the pressure required by these Rules from the smallest fire pump permitted by Rule 61(5), provided that the diameter of the nozzles shall not be required to be greater than 19 mm.
- (c) For accommodation and service spaces the diameter of the nozzles shall not be required to be greater than 12 mm.
- (d) Every dual purpose nozzle provided in compliance with these Rules shall be capable of producing a water spray and a plain water jet and shall incorporate a shut-off facility.

Location and arrangement of water pumps for other fire extinguishing systems

64. Pumps required for the provision of water for other fire extinguishing systems required by these Rules, their sources of power and their controls shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the spaces protected will not put any such system out of action.

Special requirements for fixed fire extinguishing systems

65. (1)(a) Halogenated hydrocarbon shall not be used as an extinguishing medium on any ship.
- (b) Fire-extinguishing systems using Halon 1211, 1301 and 2402, and perfluorocarbons, are prohibited in the case of new installations on a ship constructed before 1 July 2002.
- (c) (i) Fixed carbon dioxide fire-extinguishing systems for the protection of machinery spaces and cargo pump-rooms on ships constructed before 1 July 2002 shall comply with the

provisions of paragraph 2.2.2 of Chapter 5 of the Fire Safety Systems Code.

- (ii) In this Rule, “Fire Safety Systems Code” means the International Code for Fire Safety Systems as adopted by the Maritime Safety Committee of the IMO by resolution MSC.98(73), as may be amended by the IMO, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of Article VIII of the Safety Convention concerning the amendment procedures applicable to the annex other than chapter I;
- (2) (a) Where a fixed pressure water spraying system is used for the protection of special category spaces, cargo spaces where permitted by these Rules or ro-ro cargo spaces, special consideration shall be given to the bilge pumping and drainage arrangements where such spaces are below the bulkhead deck and to the scupper arrangements where such spaces are above the bulkhead deck.
 - (b) In the case of a ship of Class I or Class II constructed on or after 1 July 1997 which contains special category spaces or ro-ro cargo spaces above the bulkhead deck, discharge valves for scuppers fitted with positive means of closing operable from a position above the bulkhead deck in accordance with Rules or Regulations made under the Merchant Shipping (Load Lines) Act 1968 shall be kept open while the ship is at sea.
 - (c) Any operation of the valves referred to in subparagraph (b) shall be recorded in the log-book.

Fixed low-expansion foam fire extinguishing systems in machinery spaces fitted in addition to requirements of these Rules

66. (1) Where in any machinery space a fixed low-expansion foam fire extinguishing system is fitted in addition to the requirements of these Rules, such system shall be capable of discharging through fixed discharge outlets in not more than 5 minutes a quantity of foam sufficient to cover to a depth of 150 mm the largest single area over which oil fuel is liable to spread. The system shall be capable of generating foam suitable for extinguishing oil fires. Means shall be provided for effective distribution of the foam through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the foam to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The expansion ratio of the foam shall not exceed 12 to 1.

(2) The means of control of any such system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

Fixed fire extinguishing systems not required by these Rules

67. In every ship where a fixed extinguishing system not required by these Rules is provided, such a system shall be to the satisfaction of the Minister, shall be installed outside the space or spaces protected by such systems and shall be so arranged that a fire in the space or spaces protected will not put any such system out of action.

Fire extinguishers

68. (1) Non-portable foam, carbon dioxide and dry powder fire extinguishers shall be of approved types and designs and shall meet the requirements of Schedules 2, 3 and 4 respectively.

- (2) (a) Portable fire extinguishers (other than carbon dioxide fire extinguishers) shall, if they are of a type discharging fluid, have a capacity of not more than 13.5 litres and not less than 9 litres.
- (b) Portable carbon dioxide fire extinguishers shall have a capacity of not less than 3 kilogrammes of carbon dioxide.
- (c) Portable dry powder fire extinguishers shall have a capacity of not less than 4.5 kilogrammes of dry powder.
- (d) Portable fire extinguishers of other types shall be of not less than the fire extinguishing equivalent of a 9 litre fluid fire extinguisher.

(3) Portable fire extinguishers for use in accommodation or service spaces of any ship shall so far as practicable have a uniform method of operation.

(4) Portable fire extinguishers shall, subject to paragraphs (2) and (3), be of an approved type and design in accordance with the Regulations of 2017.

(5) Portable and non-portable fire extinguishers shall be periodically examined and subject to such tests as the Minister may require.

(6) Where portable dry powder fire extinguishers are provided either in accommodation and service spaces or in machinery spaces their number shall not exceed one half of the total number of extinguishers provided in either of these spaces.

(7) Portable carbon dioxide extinguishers shall not be located in accommodation spaces. Where such extinguishers are provided in radio rooms, at switchboards and other similar positions, the volume of any space containing one or more extinguishers shall be such as to limit the concentration of vapour that can occur due to discharge to not more than 5 per cent of the net volume of the space. For the purpose of this Rule the volume of carbon dioxide shall be calculated at 0.56 m³/kilogramme.

(8) One of the portable fire extinguishers intended for use in any space shall be stored near the entrance to that space.

(9) Fire extinguishers provided for use in any ship to which these Rules apply shall not contain any extinguishing medium which has not been approved by the Minister.

(10) For the purposes of these Rules:

- (a) the capacity of a carbon dioxide extinguisher shall be taken to be the greatest weight of carbon dioxide which it can safely contain in a tropical climate;
- (b) the capacity of any fire extinguisher, other than a carbon dioxide fire extinguisher, shall be taken to be the greatest volume or weight of extinguishing medium which it can contain when sufficient space is left to ensure the proper operation of the extinguisher.

(11) Every fire extinguisher provided in compliance with these Rules shall be kept fully charged at all times.

(12) Spare charges shall be provided to the extent of at least 50 per cent for each type of fire extinguisher provided in compliance with these Rules, except that for each such fire extinguisher which is of a type that cannot readily be recharged while the ship is at sea, an additional portable fire extinguisher of the same type, or its equivalent shall be provided in lieu of a spare charge.

Fire buckets

69. (1) Every fire bucket provided in compliance with these Rules shall be painted red and shall be clearly and permanently marked with the word "FIRE". Except in open ships, every such fire bucket shall be kept filled with sand or water.

(2) Except in open ships, fire buckets provided in compliance with these Rules shall not be used for any purpose other than extinguishing fire.

Fire-fighter's outfits

70. (1) Every fire-fighter's outfit carried in compliance with these Rules shall consist of:

- (a) a breathing apparatus complying with the requirements specified in Schedule 5; and
- (b) personal equipment comprising:
 - (i) a portable self-contained electric battery-operated safety lamp of an approved type capable of functioning efficiently for a period of at least 3 hours;
 - (ii) a fire-fighter's axe;
 - (iii) protective clothing of material capable of protecting the skin from the heat radiating from the fire and from burns and scalding by steam, the outer surface of which shall be water resistant;
 - (iv) boots and gloves of rubber or other electrically non-conducting material; and
 - (v) a rigid helmet providing effective protection against impact.

(2) Fire-fighter's outfits shall be stored in readily accessible positions which are not likely to be cut off in the event of fire and, except as provided for by Rule 14(2), where more than one such outfit is provided, they shall be stored in widely separated positions.

Means for stopping machinery, shutting off oil fuel suction pipes and closing of openings

71. (1) In every ship to which these Rules apply, there shall be provided:

- (a) means for stopping ventilation fans serving machinery, accommodation and cargo spaces;
- (b) means for closing all skylights, doorways, ventilators, annular spaces around funnels and other openings to such spaces; and
- (c) means to permit the release of smoke from machinery spaces.

Such means shall be capable of being operated from positions outside the said spaces and which would not be made inaccessible by a fire within such spaces.

(2) Machinery driving forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps shall be fitted with remote controls situated outside the spaces in which such machinery or pumps are situated and which would not be made inaccessible by a fire within such spaces. The controls shall be capable of stopping such machinery or pumps in the event of fire in such spaces. For machinery spaces in passenger ships, such controls together with the controls required in paragraph (1) shall be situated at one control position or grouped in as few positions as possible. Such controls shall have safe access from the open deck.

(3) Except as provided for in paragraph (4), in every ship to which these Rules apply, every pipe connected to any oil fuel or lubricating oil storage, settling, or daily service tank, not being a double bottom tank, which if damaged would permit discharge of the contents so as to cause a fire hazard, shall be fitted with a valve or cock which shall be secured to the tank to which it is connected and which shall be capable of being closed from a readily accessible position outside the space in which the tank is situated, provided that in the case of any inlet pipe to such a tank, a non-return valve secured to the tank may be substituted. In the case of an oil fuel or lubricating oil deep tank situated in or adjacent to a shaft or pipe tunnel or similar space, a valve or valves (additional to the valve required to be fitted on the tank) may be fitted on the pipe line or lines outside the tunnel or tunnels or similar spaces to enable control to be exercised in the event of fire. Such valve if fitted in the machinery space shall be operated from a position outside the space.

(4) The valve or cock required by paragraph (3) may be dispensed with in the case of a pipe connected to a lubricating oil tank fitted in a space other than a machinery space of Category 'A' provided that the safety of the ship is not impaired.

Gaseous fuel for domestic purposes

72. Where gaseous fuel is used for domestic purposes, the arrangements for storage, distribution and utilisation of the fuel shall be in accordance with Rule 55 of the Cargo Ship Construction Rules 1985 or Rule 80 of the Passenger Ship Construction Rules 1985.

Instructions, duties and organisation

73. (1) Crew members shall receive instruction on fire safety on-board the ship and on their assigned duties.

(2) Parties responsible for fire-extinguishing shall be organised and shall have the capability to complete their duties at all times while the ship is in service.

On-board training and drills

74. (1) Crew members shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any fire-fighting systems and appliances that they may be called upon to use.

(2) Training in the use of the emergency escape breathing devices shall be considered as part of on-board training.

(3) (a) Performance of crew members assigned fire-fighting duties shall be periodically evaluated by conducting on-board training and drills to identify areas in need of improvement, to ensure competency in fire-fighting skills is maintained, and to ensure the operational readiness of the fire-fighting organisation.

(b) In addition to the requirement in subparagraph (a), in the case of a ship of Class I, Class II and a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) and Class VIII(T), fire drills shall be conducted in accordance with Rule 31 of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018), having due regard to notification of passengers and movement of passengers to assembly stations and embarkation decks.

(4) On-board training in the use of the ship's fire-extinguishing systems and appliances shall be planned and conducted in accordance with Rule 20(5)(a) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018).

(5) Fire drills shall be conducted and recorded in accordance with Rules 20(3), (4) and (6) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018).

Training manuals

75. (1) A training manual shall be provided in each crew mess room and recreation room or in each crew cabin.

- (2) The training manual provided in accordance with paragraph (1):
- (a) shall be written in the working language of the ship;
 - (b) may comprise several volumes; and
 - (c) shall contain the instructions and information required in paragraph (3) in easily understood terms and illustrated wherever possible. Any part of such information may be provided in the form of audio-visual aides in lieu of the manual.
- (3) The training manual provided in accordance with paragraph (1) shall explain the following in detail:
- (a) general fire safety practice and precautions related to the dangers of smoking, electrical hazards, flammable liquids and similar common shipboard hazards;
 - (b) general instructions on fire-fighting activities and fire-fighting procedures, including procedures for notification of a fire and use of manually operated call points;
 - (c) the meanings of the ship's alarms;
 - (d) operation and use of fire-fighting systems and appliances;
 - (e) operation and use of fire doors;
 - (f) operation and use of fire and smoke dampers; and
 - (g) escape systems and appliances.

Fire control plans

76. (1) In every ship there shall be permanently exhibited by the owner of the ship for the guidance of the master and officers of the ship, general arrangement plans showing clearly for each deck of a ship the position of the control stations, the fire sections of the ship that are enclosed by "A" class divisions, the sections of the ship that are enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installations, the fixed and portable fire extinguishing appliances and fire-fighter's outfits, the means of access to the different compartments and decks in the ship, the ventilating system including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section of the ship, the location of the international shore connection and the position of all means of control referred to in Rule 71. The general arrangement fire control plans shall be prepared having regard to the Graphical symbols for ship board fire control plans as adopted by the IMO in resolution A.952(23). Descriptions in such plans shall be in English.

(2) As an alternative to paragraph (1), at the discretion of the Minister, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy shall at all times be available on board the ship in an accessible position. Plans and booklets shall be kept up to date and any alterations thereto shall be recorded as soon as practicable. Description in such plans and booklets shall be in English.

(3) The general arrangement plans required by this Rule shall be kept up to date, any alterations to general arrangements being recorded thereon without delay.

(4) A duplicate set of the general arrangement fire control plans or a booklet containing such plans required by this Rule shall be permanently stored in a prominently marked weathertight enclosure outside the deck house for the assistance of shore-side fire-fighting personnel having regard to the Guidance concerning the location of fire control plans for assistance of shoreside fire-fighting personnel in IMO Circular MSC/Circ.451.

(5) Instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept in one book, readily available in an accessible position.

(6) In the case of a ship of Class I or Class II constructed on or after 1 October 1994 and carrying more than 36 passengers, the plans and books required by this Rule shall provide information regarding fire protection, fire detection and fire extinction based on the Guidelines on the information to be provided with fire control plans and booklets required by SOLAS regulations II-2/20 and 41-2, as adopted by the IMO by resolution A.756(18).

Operations – fire safety operational booklets

77. (1) A fire safety operational booklet shall be provided on board a ship and shall contain the necessary information and instructions for the safe operation of the ship and the cargo handling operations in relation to fire safety.

(2) The fire safety operational booklet provided in accordance with paragraph (1) shall include:

- (a) information concerning the crew's responsibilities for the general fire safety of the ship while loading and discharging cargo and while underway;
- (b) an explanation of necessary fire safety precautions for handling general cargoes;
- (c) in the case of a ship carrying dangerous goods and flammable bulk cargoes, reference to the pertinent fire-fighting and emergency cargo handling instructions contained in the IMSBC Code, the International Bulk Chemical Code, the International Gas Carrier Code and the IMDG Code, as appropriate.

(3) The fire safety operational booklet shall be provided in each crew mess room and recreation room or in each crew cabin and shall be written in the working language of the ship.

(4) The fire safety operational booklet may be combined with the training manuals required in accordance with Rule 75.

(5) In a tanker, the fire safety operational booklet provided in accordance with this Rule shall include provisions for preventing fire spread to the cargo area due to ignition of flammable vapours and include procedures of cargo tank gas-purging or gas-freeing taking into account Rule 51.

Availability of fire fighting appliances

78. Fire appliances carried on a ship shall be maintained in good order and shall be available for immediate use at all times. Movable fire appliances, other than fire-fighter's outfits, carried in compliance with these Rules shall be stowed where they will be readily accessible from the spaces in which they are intended to be used and, in particular, one of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

Deep fat cooking equipment

79. In the case of new installations on ships constructed before 1 July 2002, deep-fat cooking equipment installed in enclosed spaces or on open decks shall be fitted with the following:

- (1) an automatic or manual extinguishing system tested to an international standard such as ISO 15371 on fire-extinguishing systems for protection of galley deep-fat cooking equipment;
- (2) a primary and backup thermostat with an alarm to alert the operator in the event of failure of either thermostat;
- (3) arrangements for automatically shutting off the electrical power upon activation of the extinguishing system;
- (4) an alarm to indicate operation of the fire-extinguishing system in the galley where the equipment is installed; and
- (5) controls for manual operation of the fire-extinguishing system that are clearly labelled for ready use by the crew.

Operational readiness and maintenance

80. (1)(a) At all times while a ship is in service, the fire protection systems and fire-fighting systems and appliances shall be maintained ready for use.
- (b) For the purposes of this Rule, a ship is not in service when:
- (i) it is in a port for repairs or is laid up (either at anchor or in port) or in dry-dock;
 - (ii) it is declared not in service by the owner or the owner's representative; and
 - (iii) in the case of a passenger ship, there are no passengers on board.
- (2) The following fire protection systems shall be kept in good order so as to ensure their operational readiness and required performance in the event of a fire occurring:
- (a) structural fire protection including fire-resisting divisions and protection of openings and penetrations in these divisions;
 - (b) fire detection and fire alarm systems; and

(c) means of escape systems and appliances.

(3) Fire-fighting systems and appliances shall be kept in good working order and readily available for immediate use. Portable extinguishers that have been discharged shall be immediately recharged or replaced with an equivalent unit.

Maintenance, testing and inspections

81. (1) Maintenance, testing and inspections shall be carried out based on the Revised Guidelines for the maintenance and inspection of fire protection systems and appliances in IMO MSC.1/Circ.1432 in its updated version and in a manner that has due regard to ensuring the reliability of fire-fighting systems and appliances.

(2) The maintenance plan shall:

- (a) be kept on board the ship;
- (b) be available for inspection whenever required by the Minister;
- (c) include at least the following fire protection systems and fire-fighting systems and appliances, where installed:
 - (i) fire mains, fire pumps and hydrants, including hoses, nozzles and international shore connections;
 - (ii) fixed fire detection and fire alarm systems;
 - (iii) fixed fire-extinguishing systems and other fire-extinguishing appliances;
 - (iv) automatic sprinkler, fire detection and fire alarm systems;
 - (v) ventilation systems, including fire and smoke dampers, fans and their controls;
 - (vi) emergency shutdown of fuel supply;
 - (vii) fire doors, including their controls;
 - (viii) general emergency alarm systems;
 - (ix) emergency escape breathing devices;
 - (x) portable fire extinguishers, including spare charges; and
 - (xi) fire-fighter's outfits.

(3) The maintenance programme may be computer-based.

Additional requirements for passenger ships and tankers

82. In addition to the fire protection systems and appliances listed in Rule 81(2)(c):

(1) in a passenger ship carrying more than 36 passengers, a maintenance plan for low-location lighting and public address systems shall be developed;

(2) a tanker shall have a maintenance plan for:

- (a) inert gas systems;

- (b) deck foam systems;
- (c) fire safety arrangements in cargo pump rooms; and
- (d) flammable gas detectors.

PART 6

STRUCTURAL FIRE PROTECTION

Passenger Ships

Ships of Class I, II and II(A) carrying more than 36 passengers

Rules application to ships of Class I, II and II(A) carrying more than 36 passengers

83. Rules 84 to 98 inclusive apply to passenger ships of Class I, II and II(A) carrying more than 36 passengers.

Structure

84. (1) The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material, except that the crowns and casings of machinery spaces of Category A shall be constructed only of steel.

(2) Where any part of the structure is of aluminium alloy, the following requirements shall apply:

- (a) the insulation of aluminium alloy components of “A” class divisions or “B” class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” class division and 30 minutes duration in the case of a “B” class division; and
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, shall be such that the temperature rise limitation specified in subparagraph (a) shall apply for 60 minutes duration.

Main vertical zones and horizontal zones

85. (1)(a) The hull, superstructure and deckhouses shall be subdivided by bulkheads consisting of “A” class divisions into main vertical zones except in respect of special category spaces or ro-ro cargo spaces to which Rule 96 applies. The mean length of each zone on any one deck, above the bulkhead deck, shall not exceed 40 m. Steps and recesses shall be kept to a minimum, but any which are

necessary shall consist of “A” class divisions. These divisions shall have insulation values in accordance with the Tables to Rule 87.

- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by A-60 class divisions except in respect of special category spaces or ro-ro cargo spaces to which Rule 96 applies. Steps and recesses shall be kept to a minimum but where they are necessary, they shall also be A-60 class divisions. Where a space of category (5), (9) or (10) referred to in Rule 87(3)(b) is on one side of the division, the standard may be reduced to A-0.
 - (c) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by A-60 class divisions except in respect of special category spaces or ro-ro cargo spaces to which Rule 96 applies. Steps and recesses shall be kept to a minimum but where they are necessary, they shall also be A-60 class divisions. Where a space of category (5), (9) or (10) referred to in Rule 87(3)(b) is on one side or where fuel oil tanks are on both sides of the division, the standard may be reduced to A-0.
- (2) (a) Any portions of such divisions which extend above the bulkhead deck shall, whenever possible, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck and shall extend from deck to deck and to the ship's shell, and in the case of a deckhouse, to the external plating thereof.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, the length and width of main vertical zones may be extended to a maximum of 48 m in order to bring the ends of main vertical zones to coincide with subdivision watertight bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600m² on any deck. The length or width of a main vertical zone is the maximum distance between the furthestmost points of the bulkheads bounding it.
- (3) (a) A main vertical zone may, for the purpose of Rule 95, be subdivided by horizontal “A” class divisions into two or more parts provided that such horizontal divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall have insulation and integrity values in accordance with Table 3 to Rule 87.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, where a main vertical zone, for the purpose of Rule 95, is subdivided by horizontal “A” class divisions into two or more parts, it shall have insulation and integrity values in accordance with Table 2 to Rule 104.

(4) In ships designed for special purposes such as train services, where the provision of main vertical zone bulkheads would conflict with the purpose for which the ship is intended, the Minister may allow an equivalent means for controlling and limiting a fire to be substituted.

Bulkheads within a main vertical zone

86. (1) Every bulkhead within the accommodation spaces or service spaces not being a bulkhead required by these Rules to consist of an “A” class division, shall consist of a “B” class division or “C” class division as required by the Tables to Rule 87. All such divisions may be faced with combustible materials in accordance with Rule 93.

(2) All corridor bulkheads where not required to be “A” class divisions shall be “B” class divisions which shall extend from deck to deck except that:

- (a) when continuous “B” class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which in thickness and composition meets the requirements of “B” class divisions, but which is required to meet “B” class fire integrity standards only so far as is reasonable and practicable in the opinion of the Minister, and
 - (b) in the case of a ship protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7, the corridor bulkheads of “B” class materials may terminate at ceiling in the corridor, provided that such a ceiling is of material which in thickness and composition meets the requirements of “B” class divisions. Notwithstanding the requirement of Rule 87, such bulkheads and ceilings shall be required to meet “B” class fire integrity standards only so far as is reasonable and practicable in the opinion of the Minister. All doors and their frames in such bulkheads shall be of non-combustible materials and shall be constructed and erected so as to provide substantial fire resistance to the satisfaction of the Minister.
 - (c) subject to Rule 103(2), paragraph (2) shall not apply in the case of a ship of Class I or Class II constructed on or after 1 October 1994.
- (3) (a) Every bulkhead required to be a “B” class division, except a corridor bulkhead, shall extend from deck to deck and to the shell or other boundaries unless continuous “B” class ceilings or linings are fitted on both sides of the bulkhead in which case the bulkhead may terminate at the continuous ceiling or lining.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, all bulkheads required to be a “B” class division shall extend from deck to deck and to the shell or other boundaries unless the continuous “B” class ceilings or linings fitted on both sides of the bulkheads are at least of the same fire resistance as

the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

Fire integrity of bulkheads and decks

87. (1)(a) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of these Rules, the minimum fire integrity and insulation standards of all bulkheads and decks shall be as set out in paragraphs (2) to (5) and in Tables 1 to 4 to this Rule.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the minimum fire integrity of all bulkheads and decks shall be as set out in paragraphs (2) to (5) and in Tables 5 and 6.
- (2) Where, due to any particular structural arrangement in the ship, there may be doubt in determining from the Tables the minimum fire integrity and insulation standard of any division, such standard shall be determined to the satisfaction of the Minister.
- (3) The following requirements shall govern application of the Tables:
- (a) (i) Table 1 shall apply to bulkheads bounding main vertical zones or horizontal zones;
- (ii) Table 2 shall apply to bulkheads not bounding either main vertical zones or horizontal zones;
- (iii) Table 3 shall apply to decks forming steps in main vertical zones or bounding horizontal zones;
- (iv) Table 4 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones; and
- (v) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, Table 5 shall apply to bulkheads not bounding either main vertical zones or horizontal zones and Table 6 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones;
- (b) for the purpose of determining the appropriate fire integrity and insulation standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (14) below. The title of each category is intended to be typical rather than restrictive. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this Rule, it shall be treated as a space within the relevant category having the most stringent boundary requirements. The number in parentheses preceding each category refers to the applicable column or row in the Tables:
- (1) control stations and similar spaces; spaces containing centralized emergency public address systems and equipment;

- (2) stairways, including interior stairways, lifts and escalators and enclosures thereto (other than those wholly contained within machinery spaces) for passengers or crew; a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door;
- (3) corridors, including passenger and crew space corridors and lobbies except in the case of a ship of Class I or Class II constructed on or after 1 October 1994, in which case corridors do not include passenger and crew space lobbies;
- (4)
 - (a) lifeboat and liferaft handling and embarkation stations including open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations;
 - (b) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, evacuation stations and external escape routes including:
 - a survival craft stowage area;
 - open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations;
 - internal and external muster stations;
 - external stairs and open decks used for escape routes;
 - the ship's side to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the embarkation areas for liferafts and evacuation slides;
- (5) open deck spaces, including:
 - open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations;
 - the air space outside superstructures and deckhouses;
- (6) accommodation spaces of minor fire risk, including:
 - cabins that are rooms containing furniture and furnishings of restricted fire risk;
 - public spaces that are rooms containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m²;
 - offices and dispensaries that are rooms containing furniture and furnishings of restricted fire risk;

- (7) accommodation and service spaces of moderate fire risk, including:

spaces listed in category (6) but which are rooms containing furniture and furnishings of other than restricted fire risk;

public spaces that are rooms containing furniture and furnishings of restricted fire risk and having a deck area of 50 m² or greater;

lockers and small store-rooms in accommodation spaces having a deck area of less than 4 m² (in which flammable liquids are not stowed);

sale shops;

motion picture projection and film storage rooms; laboratories in which no flammable liquids are stowed;

pharmacies;

drying rooms having a deck area of less than 4 m²;

diet kitchens (containing no open flame);

cleaning gear lockers (in which flammable liquids are not stored);

specie rooms;

and in the case of a ship of Class I or Class II constructed on or after 1 October 1994, operating rooms.

- (8) accommodation spaces of greater fire risk, including:

public spaces that are rooms containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m² or greater;

barber shops, hairdressing salons and beauty parlours;

- (9) sanitary and similar spaces, including:

communal sanitary facilities, showers, baths and water closets;

laundry rooms having a deck area of less than 6 m², indoor swimming pool areas;

pantries containing no cooking appliances and not annexed to galleys;

private sanitary facilities shall be considered part of the accommodation space in which they are located;

operating theatres or operating rooms, except in the case of a ship of Class I or Class II constructed on or after 1 October 1994.

- (10) tanks, voids and auxiliary machinery spaces having little or no fire risk including:

water tanks forming part of the ship's structure;

voids and cofferdams;

auxiliary machinery spaces that do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:

a ventilation and air-conditioning room; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; a room containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA); shaft alleys and pipe tunnels; spaces for pumps and refrigeration machinery not handling or using flammable liquids; closed trunks serving the aforementioned spaces; other closed trunks such as pipe and cable trunks;

- (11) auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other spaces of moderate fire risk, including:

cargo oil tanks;

cargo holds, ro-ro cargo spaces, trunkways and hatchways; refrigerated chambers;

oil fuel tanks (where installed in a separate space with no machinery);

shaft alleys and pipe tunnels allowing storage of combustibles;

auxiliary machinery spaces specified in category (10) that contain machinery having a pressure lubrication system or where storage of combustibles is permitted;

oil fuel filling stations;

spaces containing oil-filled electrical transformers (above 10 kVA);

spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kilowatts driving emergency generators, sprinkler pumps, drencher pumps or fire pumps, and bilge pumps;

special category spaces (Tables 1 and 3 only apply), except in the case of a ship of Class I or Class II constructed on or after 1 October 1994; and

in the case of a ship of Class I or Class II constructed on or after 1 October 1994, all generators and closed trunks serving the auxiliary machinery spaces listed in this category;

- (12) machinery spaces and galleys, including:

main propelling machinery rooms other than electrical propulsion motor rooms; boiler rooms; auxiliary machinery spaces, other than those in categories (10) and (11), that contain internal combustion machinery or other oil-burning, heating or pumping units;

galleys and annexes;

pantries containing cooking appliances;

trunks and casings to the spaces listed in this category;

(13) store-rooms, workshops and similar spaces, including:

main pantries not annexed to galleys;

laundry rooms having a deck area of 6 m² or greater;

drying-rooms having a deck area of 4 m² or greater;

lockers and store-rooms having a deck area greater than 4m², other than those that provide storage for flammable liquids;

miscellaneous stores;

mail and baggage rooms;

garbage rooms;

workshops, not part of machinery spaces or galleys;

(14) other spaces in which flammable liquids are stowed, including:

lamp rooms;

paint rooms;

store-rooms containing flammable liquids (including dyes, medicines or portable spirits);

laboratories in which flammable liquids are stowed;

- (c) where a single value is shown for the fire integrity of a division between two spaces, that value shall apply in all cases;
- (d) in the case of a ship constructed before 1 October 1994, in determining the applicable fire integrity standard of a division between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 or between such zones neither of which is so protected, the higher of the two values given in the Tables to this Rule shall apply;
- (e) in the case of a ship constructed before 1 October 1994, in determining the applicable fire integrity standard of a division between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7,

or between such zones both of which are so protected, the lesser of the two values given in the Tables to this Rule shall apply. Where a main vertical zone or horizontal zone provided with a sprinkler system and a main vertical or horizontal zone not provided with such a system meet within accommodation and service spaces, the higher of the two values given in the Tables shall apply to the division between the zones;

- (f) where adjacent spaces are in the same numerical category and superscript “a” appears in Tables 2, 4, 5 and 6, a bulkhead or deck between such spaces may not be required to be fitted if deemed unnecessary by the Minister;
- (g) where the superscript “b” appears in the Tables to this Rule, the lesser insulation value may be permitted where at least one of the adjoining spaces is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7;
- (h) where a dash appears in Tables 1, 2, 4 and 6, no special requirements for material or integrity of boundaries are required;
- (i) in the case of a ship constructed before 1 October 1994, the Minister may, in respect of category (5) spaces, permit lower standards than the integrity values in Tables 1 or 2, for the ends of deckhouses and superstructures, and the integrity values in Tables 3 or 4 for weather decks. The requirements of Tables 1 to 4 in respect of category (5) shall not necessitate enclosure of spaces which, in the opinion of the Minister, need not be enclosed; and
- (j) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, the Minister shall determine in respect of category (5) spaces whether the insulation values in Table 5 shall apply to ends of deckhouses and superstructures, and whether the insulation values in Table 6 shall apply to weather decks. In no case shall the requirements of category (5) or Tables 5 or 6 necessitate enclosure of spaces that in the opinion of the Minister need not be enclosed.

(4) Continuous “B” class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing wholly or in part, to the required insulation and integrity of a division.

(5) The integrity of “A” class divisions shall be maintained at the intersections and boundaries of such divisions.

Table 2

Bulkheads not bounding either main vertical zones or horizontal zones for ships constructed before 1 October 1994

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control Stations (1)	B-0 ^a	A-0	A-0	A-0	A-0 B-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways (2)		A-0 ^a	A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15	A-30	A-15 A-0	A-30
Corridors (3)			C	A-0	A-0 B-0	B-0	B-15 B-0	B-15 B-0	B-0	A-0	A-15	A-30	A-0	A-30 A-0
Lifeboat and liferaft handling and embarkation stations (4)				–	–	A-0	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-15
Open deck spaces (5)					–	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0 B-0
Accommodation spaces of minor fire risk (6)						B-0 C	B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-30	A-0	A-30 A-0
Accommodation spaces of moderate fire risk (7)							B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-60	A-15 A-0	A-60 A-15
Accommodation spaces of greater fire risk (8)								B-15 C	B-0 C	A-0	A-30 A-0	A-60	A-15 A-0	A-60 A-15
Sanitary and similar spaces (9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk (10)										A-0 ^a	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk (11)											A-0 ^a	A-0	A-0	A-30 ^b A-15
Machinery spaces and main galleys (12)												A-0 ^a	A-0	A-60
Store-rooms, workshops, pantries, etc. (13)													A-0 ^a	A-0
Other spaces in which flammable liquids are stored (14)														A-30 ^b A-15

Table 3

Decks forming steps in main vertical zones or bounding horizontal zones for ships constructed before 1 October 1994

Space below ↓	Space above→	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control Stations	(1)	A-60	A-60	A-30	A-0	A-0	A-15	A-30	A-60	A-0	A-0	A-30	A-60	A-15	A-60
Stairways	(2)	A-15	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Corridors	(3)	A-30	A-0	A-0	A-0	A-0	A-0	A-15 A-0	A-15 A-0	A-0	A-0	A-0	A-60	A-0	A-60
Lifeboat and liferaft handling and embarkation stations	(4)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-30 A-0	A-15 A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15 A-0	A-15	A-0	A-15
Accommodation spaces of moderate fire risk	(7)	A-60	A-60 A-15	A-30 A-0	A-15 A-0	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-30 A-0	A-30	A-0 A-0	A-30
Accommodation spaces of greater fire risk	(8)	A-60	A-60 A-15	A-60 A-15	A-60 A-15	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 A-0	A-60	A-15 A-0	A-60
Sanitary and similar spaces	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-0	A-30	A-30 ^b A-0	A-30
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-60 A-15	A-30 A-0	A-15	A-0	A-15 A-0	A-30 A-0	A-60 A-15	A-0	A-0	A-0	A-30	A-0	A-30
Other spaces in which flammable liquids are stored	(14)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60

Table 4

Decks not forming steps in main vertical zones nor bounding horizontal zones for ships constructed before 1 October 1994

Space below ↓ Space above→	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control Stations (1)	A-30 A-0	A-30 A-0	A-15 A-0	A-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0	A-60	A-0	A-60 A-15
Stairways (2)	A-0	A-0	A-0	A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30 A-0
Corridors (3)	A-15 A-0	A-0	A-0 ^a B-0 ^a	A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-15 B-0	A-0 B-0	A-0	A-0	A-30	A-0	A-30 A-0
Lifeboat and liferaft handling and embarkation stations (4)	A-0	A-0	A-0	A-0	—	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces (5)	A-0	A-0	A-0 B-0	A-0	—	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0
Accommodation spaces of minor fire risk (6)	A-60	A-15 A-0	A-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-15 A-0	A-0	A-15 A-0
Accommodation spaces of moderate fire risk (7)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-0 B-0	A-15 B-0	A-30 B-0	A-0 B-0	A-0	A-15 A-0	A-30 A-0	A-0	A-30 A-0
Accommodation spaces of greater fire risk (8)	A-60	A-60 A-15	A-60 A-0	A-30 A-0	A-0 B-0	A-15 B-0	A-30 B-0	A-60 B-0	A-0 B-0	A-0	A-30 A-0	A-30 A-0	A-0	A-30 A-0
Sanitary and similar spaces (9)	A-0	A-0	A-0 B-0	A-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk (10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk (11)	A-60	A-60 A-15	A-60 A-15	A-30 A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-0 ^a	A-0	A-0	A-30 ^b A-15
Machinery spaces and main galleys (12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30 ^a	A-0	A-60
Store-rooms, workshops, pantries, etc. (13)	A-60	A-30 A-0	A-15 A-0	A-15 A-0	A-0 B-0	A-15 A-0	A-30 A-0	A-30 A-0	A-0 B-0	A-0	A-0	A-0	A-0	A-15 ^b A-0
Other spaces in which flammable liquids are stored (14)	A-60	A-60 A-30	A-60 A-30	A-60	A-0	A-30 A-0	A-60 A-15	A-60 A-15	A-0	A-0	A-30 ^b A-0	A-30 ^b A-0	A-0	A-30 ^b A-0

Table 5

Bulkheads not bounding either main vertical zones or horizontal zones for ships constructed on or after 1 October 1994

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations (1)	B-0 ^a	A-0	A-0	A-0	A-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways (2)		A-0 ^a	A-0	A-0	A-0	A-0	A-15	A-15	A-0 ^c	A-0	A-15	A-30	A-15	A-30
Corridors (3)			B-15	A-60	A-0	B-15	B-15	B-15	B-15	A-0	A-15	A-30	A-0	A-30
Evacuation stations and external escape routes (4)					A-0	A-60 ^b	A-60 ^b	A-60 ^b	A-0	A-0	A-60 ^b	A-60 ^b	A-60 ^b	A-60 ^b
Open deck spaces (5)					-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk (6)						B-0	B-0	B-0	C	A-0	A-0	A-30	A-0	A-30
Accommodation spaces of moderate fire risk (7)							B-0	B-0	C	A-0	A-15	A-60	A-15	A-60
Accommodation spaces of greater fire risk (8)								B-0	C	A-0	A-30	A-60	A-15	A-60
Sanitary and similar spaces (9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk (10)										A-0 ^a	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk (11)											A-0 ^a	A-0	A-0	A-15
Machinery spaces and main galleys (12)												A-0 ^a	A-0	A-60
Store-rooms, workshops, pantries etc. (13)													A-0 ^a	A-0
Other spaces in which flammable liquids are stowed (14)														A-30

Note: For ships constructed on or after 1 July 1998, superscript “d” is added in the fourth row under columns (6), (7), (8) and (9).

Notes: to be applied to Tables 5 and 6.

^a Where adjacent spaces are in the same numerical category and superscript ^a appears, a bulkhead or deck between such spaces is not required if deemed unnecessary by the Minister. For example, in category (12) a bulkhead may not be required between a galley and its annexed pantries provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is required between a galley and a machinery space even though both spaces are in category (12).

^b The ship's side, to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferafts and evacuation slides may be reduced to A-30.

^c Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure may be of “B” class integrity.

For ships constructed on or after 1 July 1998, the following note applies to Table 5:

^d Where spaces of category (6), (7), (8) and (9) are located completely within the outer perimeter of the muster station, the bulkheads of these spaces may be of “B-O” class integrity. Control positions for audio, video and light installations may be considered as part of the muster station.

Table 6

**Decks not forming steps in main vertical zones nor bounding horizontal zones for ships constructed on or after
1 October 1994**

Spaces below↓	Spaces above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations	(1)	A-30	A-30	A-15	A-0	A-0	A-0	A-15	A-30	A-0	A-0	A-0	A-60	A-0	A-60
Stairways	(2)	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-30	A-0	A-30
Corridors	(3)	A-15	A-0	A-0 ^a	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-30	A-0	A-30
Evacuation stations and external escape routes	(4)	A-0	A-0	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Open deck spaces	(5)	A-0	A-0	A-0	A-0	-	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of minor fire risk	(6)	A-60	A-15	A-0	A-60	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of moderate fire risk	(7)	A-60	A-15	A-15	A-60	A-0	A-0	A-15	A-15	A-0	A-0	A-0	A-0	A-0	A-0
Accommodation spaces of greater fire risk	(8)	A-60	A-15	A-15	A-60	A-0	A-15	A-15	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Sanitary and similar spaces	(9)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk	(10)	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0	A-0 ^a	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk	(11)	A-60	A-60	A-60	A-60	A-0	A-0	A-15	A-30	A-0	A-0	A-0 ^a	A-0	A-0	A-30
Machinery spaces and main galleys	(12)	A-60	A-60	A-60	A-60	A-0	A-60	A-60	A-60	A-0	A-0	A-30	A-30 ^a	A-0	A-60
Store-rooms, workshops, pantries, etc.	(13)	A-60	A-30	A-15	A-60	A-0	A-15	A-30	A-30	A-0	A-0	A-0	A-0	A-0	A-0
Other spaces in which flammable liquids are stowed	(14)	A-60	A-60	A-60	A-60	A-0	A-30	A-60	A-60	A-0	A-0	A-0	A-0	A-0	A-0

Notes: to be applied to Tables 5 and 6.

^a Where adjacent spaces are in the same numerical category and superscript ^a appears, a bulkhead or deck between such spaces is not required if deemed unnecessary by the Minister. For example, in category (12) a bulkhead may not be required between a galley and its annexed pantries provided the pantry bulkhead and decks maintain the integrity of the galley boundaries. A bulkhead is required between a galley and a machinery space even though both spaces are in category (12).

^b The ship's side, to the waterline in the lightest seagoing condition, superstructure and deckhouse sides situated below and adjacent to the liferafts and evacuation slides may be reduced to A-30.

^c Where public toilets are installed completely within the stairway enclosure, the public toilet bulkhead within the stairway enclosure may be of “B” Class integrity.

Protection of stairways and lifts in accommodation and service spaces

88. (1) All stairways shall be of steel frame construction, except where the Minister approves the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, except that:

- (a) a stairway connecting only two decks is not required to be enclosed on both decks provided that the integrity of the deck is maintained by bulkheads or doors at one between-deck space. When a stairway is closed at one between-deck space, the stairway enclosure shall have the same integrity standard as is required by the Tables to Rule 87 for the deck which separates the between-deck spaces;
- (b) stairways may be fitted in the open in a public space, provided that they lie wholly within such public space.

(2) Every opening in a stairway enclosure shall be provided with a means of closure which shall be permanently attached thereto.

(3) (a) Every stairway enclosure shall have direct communication with the corridors and be of sufficient area to prevent congestion, having regard to the number of persons likely to use it in an emergency. In so far as is practicable, stairway enclosures shall not give direct access to cabins, service lockers or other enclosed spaces containing combustibles in which a fire is likely to originate.

(b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, stairway enclosures shall have direct access with the corridors and shall be of a sufficient area to prevent congestion, having regard to the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for safety equipment and open information counters are permitted. Only public spaces, corridors, public toilets, special category spaces, other escape stairways required by Rule 119(3)(c) and external areas are permitted to have direct access to these stairway enclosures.

(4) Every lift trunk shall be so fitted as to prevent the passage of smoke and flame from one between-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

Openings in "A" class divisions

89. (1) Where an "A" class division is pierced for the passage of electric cables, pipes, trunks, girders, beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (7).

(2) Where ventilation ducts pass through "A" class divisions, the requirements of Rule 91 shall apply.

(3) Except for hatches between special category spaces or ro-ro cargo spaces within a single horizontal zone, or hatches between cargo spaces or stores or baggage spaces, and hatches between such spaces and the weather decks, every opening shall be provided with permanently attached means of closing which shall be at least as effective for resisting fire as the division in which it is fitted.

(4) Every door and door frame in an "A" class division and the means of securing the door when closed shall provide resistance to fire as well as to the passage of smoke and flame, as far as practicable, equivalent to that of the bulkhead in which the door is situated; provided that a watertight door shall not be required to be insulated.

(5) Any door in such a division shall be so constructed that it can be opened and closed by one person from either side of the division.

(6) (a) Every door in a division constructed in compliance with Rules 85(1) and 88(1), except a watertight door or one which is normally locked shut, shall be self-closing and capable of closing against an adverse inclination of up to 3.5 degrees. The speed of door closure shall be controlled so as to prevent undue danger to personnel. All such doors which are held in the open position shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system; except that this requirement shall not apply to a watertight door. Hold-back hooks, not subject to control station release, are not permitted.

(b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, fire doors in main vertical zone bulkheads and stairway enclosures shall satisfy the following requirements:

(i) the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5 degrees opposing closure and shall have an approximately uniform rate of closure of no more than 40 s and no less than 10 s with the ship in the upright position;

(ii) remote-controlled sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 s but no more than 10 s before the door begins to move and continue sounding until the door is completely closed. All doors designed to re-open upon contacting an object in its path shall re-open sufficiently to allow a clear passage of at least 0.75 m, but no more than 1 m;

(iii) all doors shall be capable of remote and automatic release from a continuously manned central control station, either simultaneously or in groups, and also individually from a position at both sides of the door. Indication shall be provided at the fire control panel in the continuously manned central control station whether each of the remote-controlled doors is closed. The release mechanism shall be

- so designed that the door will automatically close in the event of disruption of the control system or central power supply. Release switches shall have an on-off function to prevent automatic resetting of the system. Hold-back hooks not subject to central control station release are prohibited;
- (iv) local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated at least ten times (fully opened and closed) using the local controls;
 - (v) double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the system;
 - (vi) doors giving direct access to special category spaces which are power-operated and automatically closed need not be equipped with alarms and remote-release mechanisms required in clauses (ii) and (iii).
- (c) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures other than power-operated watertight doors and those which are normally locked, shall satisfy the following requirements:
- (i) the doors shall be self-closing and shall be capable of closing against an angle of inclination of up to 3.5 degrees opposing closure;
 - (ii) the approximate time of closure for hinged fire doors shall be no more than 40 s and no less than 10 s from the beginning of their movement with the ship in the upright position. The approximate uniform rate of closure for sliding fire doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in the upright position;
 - (iii) the doors shall be capable of remote release from the continuously manned central control station, either simultaneously or in groups and shall also be capable of release individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;
 - (iv) hold-back hooks not subject to central control station release are prohibited;
 - (v) a door closed remotely from the central control station shall be capable of being re-opened at both sides of the door by local control. After such local opening, the door shall automatically close again;
 - (vi) indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each of the remote-released doors are closed;

- (vii) the release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system or main source of electric power;
- (viii) local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated after disruption of the control system or main source of electric power at least ten times (fully opened and closed) using the local controls;
- (ix) disruption of the control system or main source of electric power at one door shall not impair the safe functioning of the other doors;
- (x) remote-released sliding or power-operated doors shall be equipped with an alarm that sounds for at least 5 s but no longer than 10 s after the door is released from the central control station and before the door begins to move and continue sounding until the door is completely closed;
- (xi) a door designed to re-open upon contacting an object in its path shall re-open not more than 1 m from the point of contact;
- (xii) double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the control system;
- (xiii) doors giving direct access to special category spaces which are power-operated and automatically closed are not required to be equipped with the alarms and remote release mechanisms required in clauses (iii) and (x);
- (xiv) the components of the local control system shall be accessible for maintenance and adjusting;
- (xv) power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire, this being determined in accordance with Part 4 of the Fire Test Procedures Code and IMO Resolution A.754(18). This system shall satisfy the following requirements:
 - (I) the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 minutes, served by the power supply;
 - (II) the power supply for all other doors not subject to fire shall not be impaired;
 - (III) at temperatures exceeding 200°C the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed at temperatures of up to at least 945°C.

- (7) (a) Where a space is protected by an automatic sprinkler, fire detection and fire alarm system complying with Schedule 7, or fitted with a continuous “B” class ceiling, the closing of openings in decks not forming steps in main vertical zones or bounding horizontal zones shall be reasonably tight and such decks shall meet the “A” class integrity requirements in so far as is reasonable and practicable in the opinion of the Minister.
- (b) Subject to Rule 106(7), in the case of a ship of Class I or Class II constructed on or after 1 October 1994 the provisions of subparagraph (a) shall not apply.
- (8) (a) The requirements for “A” class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, subject to the requirements of Rule 92. The requirements for “A” class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening on to lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the requirements for “A” class integrity of the outer boundaries of the ship shall not apply to exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external muster station areas, external stairs and open decks used for escape routes. Stairway enclosure doors are not required to meet this requirement.
- (9) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, all “A” class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port of material, construction and fire resistance that is equivalent to the door into which it is fitted, and shall be a 150 mm square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges, or in the case of sliding doors, nearest the opening.

Openings in “B” class divisions

90. (1) Where a “B” class division is pierced for the passage of electric cables, pipes, trunks, girders, beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (4). Where ventilation ducts pass through “B” class divisions the requirements of Rule 91(11) shall apply.

- (2) (a) Doors and door frames in “B” class divisions and the means of securing them shall provide a method of closure which shall have resistance to fire as far as practicable equivalent to the division, except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². When such opening is cut in a door, it shall be fitted with a grille made of steel and shall be capable of being manually

closed from each side of the door. Doors shall be non-combustible.

- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994:
 - (i) doors and door frames in “B” class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to the divisions, except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². When such opening is cut in a door, it shall be fitted with a grille made of steel and shall be capable of being manually closed from each side of the door. Doors shall be non-combustible;
 - (ii) cabin doors in “B” class divisions shall be of a self-closing type. Hold-backs are not permitted.

(3) The requirements for “B” class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles subject to the requirements of Rule 92. The requirements for “B” class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening on to lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.

(4) In the case of a ship constructed before 1 October 1994, where an automatic sprinkler, fire detection and fire alarm system complying with Schedule 7 is fitted:

- (a) the closing of openings in decks shall be required to meet the “B” class integrity requirements only in so far as is reasonable and practicable;
- (b) openings in corridor bulkheads of “B” class materials shall be protected in accordance with Rule 86.

Ventilation systems

91. (1) Wherever practicable the system of ducts leading from each ventilation fan shall be within one main vertical or horizontal zone.

(2) Where, of necessity, a ventilation duct passes through a main vertical zone bulkhead, a fail-safe automatic closing fire damper shall be fitted adjacent to the bulkhead. The damper shall also be capable of being manually closed from each side of the bulkhead. The operating position shall be readily accessible and marked in a red light-reflecting colour. The duct between the bulkhead and the damper shall be of steel or other equivalent material and be insulated to a standard to comply with Rule 89(1). The damper shall be fitted with a visible indicator at each operating position showing whether the damper is in the open or shut position.

(3) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by Rule 89(1),

to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this Rule, vertical ducts shall be insulated as required by the appropriate Tables to Rule 87.

- (4) (a) Ducts serving a stairway enclosure shall be taken from the fan room independently of other ducts in the ventilation system and shall not serve any other space.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, stairway enclosures shall be ventilated and shall be served only by an independent fan and duct system which shall not serve any other spaces in the ventilation system.

(5) There shall be provided for every control station situated below deck, other than a control station situated in the machinery space, means to ensure ventilation, visibility and freedom from smoke within it so that, in the event of a fire in the ship, the equipment it contains may be operated effectively. Unless a control station is situated on, and has access to, an open deck or is provided with local closing arrangements equally effective to maintain ventilation, visibility and freedom from smoke in the event of a fire in the ship, there shall be provided at least two entirely separate means of supplying air to such control stations and the air inlets to these sources of supply shall be so situated that the risk of both drawing in smoke simultaneously is, as far practicable, eliminated.

(6) Ventilation ducts, except those in cargo spaces, shall be constructed as follows:

- (a) ducts not less than 0.075 m² in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of subparagraph (c) and of paragraphs (8) and (9), ducts of less than 0.075 m² in sectional area other than vertical ducts referred to in subparagraph (a) shall be constructed of non-combustible materials. Where such ducts penetrate "A" class divisions or "B" class divisions the fire integrity of such divisions shall be maintained;
- (c) ducts not exceeding 0.02 m² in sectional area nor 2 m in length are not required to be non-combustible provided that the following conditions are satisfied:
 - (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998, the ducts are constructed of a material which has low flame spread characteristics;
 - (iii) the ducts are used only at the terminal ends of the ventilation system;
 - (iv) the ducts are not located closer than 0.6 m along their lengths to penetrations of "A" class divisions or "B" class divisions.

(7) Ducts provided for the ventilation of machinery spaces of Category A, galleys, ro-ro cargo spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either:

- (a) (i) constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and greater respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;
 - (ii) suitably supported and stiffened;
 - (iii) fitted close to the boundaries penetrated with automatic fail-safe fire dampers, which are also capable of being closed manually; and
 - (iv) insulated to “A-60” standard from the machinery space, galley, ro-ro cargo space or special category space to a point at least 5 m beyond each fire damper;
- or
- (b) (i) constructed of steel in accordance with subparagraph (a)(i) and (ii) and
 - (ii) insulated to “A-60” standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone bulkheads and decks shall comply with the requirements of paragraph (2).

(8) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A, galleys, ro-ro cargo spaces or special category spaces unless either:

- (a) (i) the ducts, where they pass through a machinery space of Category A, galley, ro-ro cargo space or special category space, are constructed of steel in accordance with subparagraphs (7)(a)(i) and (ii);
 - (ii) automatic fail-safe fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated; and
 - (iii) the integrity of the boundaries of the machinery space, galley, ro-ro cargo space or special category space is maintained at the penetrations;
- or
- (b) (i) the ducts, where they pass through a machinery space of Category A, galley, ro-ro cargo space or special category space, are constructed of steel in accordance with subparagraphs (7)(a)(i) and (ii); and

- (ii) the ducts are insulated to “A-60” standard within the machinery space, galley, ro-ro cargo space or special category space;

except that penetrations of main zone bulkheads and decks shall comply with the requirements of paragraph (2).

- (9) (a) Subject to paragraph (13)(b), in the case of a ship constructed before 1 October 1994, exhaust ducts from galley ranges, where they pass through accommodation spaces or spaces containing combustible materials, shall be constructed of “A” class divisions. Every such exhaust duct shall be fitted with:
 - (i) a grease trap readily removable for cleaning;
 - (ii) an automatic fail-safe fire damper located in the lower end of the duct;
 - (iii) arrangements, operable from within the galley, for shutting off the exhaust fan; and
 - (iv) a fixed means of extinguishing a fire within the duct using either carbon dioxide or a water spray system.
- (b) In addition to complying with subparagraph (a)(ii), galley ventilation ducts shall also comply with paragraph (7).

(10) Where a ventilation duct of sectional area exceeding 0.02 m² passes through an “A” class bulkhead or deck, the opening in the bulkhead or deck shall be lined with a steel sleeve unless the duct, where it passes through the bulkhead or deck, is constructed of steel. At the penetration the sleeve or duct shall comply with the following specification:

- (a) the duct or sleeve shall have a thickness of at least 3 mm over a length of 900 mm and as far as possible one half of that length shall be on each side of the bulkhead or deck. The duct or sleeve shall be insulated so as to maintain the standard of fire integrity of the bulkhead or deck;
- (b) every duct shall be fitted with a fire damper which is capable of being closed manually from each side of the divisions, unless the Minister determines otherwise. In every duct of sectional area exceeding 0.075 m² the fire damper shall also operate automatically. The operating position shall be readily accessible and be marked in a red light-reflecting colour. The damper shall be fitted with a visible indicator showing whether the damper is in the open or shut position. Fire dampers are not required, however, where ducts pass through spaces surrounded by “A” class divisions without serving these spaces, provided that those ducts have the same fire integrity and insulation value as the divisions which they pierce. Where divisions have differing “A” class standards the ducts shall be of the higher standard.

(11) Where a ventilation duct of sectional area exceeding 0.02 m² passes through a “B” class division, the opening shall be lined with a steel sleeve of 900 mm in length unless the duct, where it passes through the division, is constructed

of steel. One half of this length shall as far as possible be on each side of the division.

(12) In the case of a ship of Class I or Class II constructed on or after 1 January 1994, where public spaces span 3 or more open decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the space shall be equipped with a smoke extraction system. The smoke extraction system shall be activated by the required smoke detection system and be capable of manual control. The fans shall be sized such that the entire volume within the space can be exhausted in 10 minutes or less.

(13) In the case of a ship of Class I or Class II constructed on or after 1 October 1994:

- (a) ventilation ducts shall be provided with suitably located hatches for inspection and cleaning, where reasonable and practicable;
- (b) exhaust ducts from galley ranges in which grease or fat is likely to accumulate shall meet the requirements of Rules 98 and 108(7) and shall be fitted with:
 - (i) a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;
 - (ii) a fire damper located in the lower end of the duct which is automatically and remotely operated, and in addition a remotely operated fire damper located in the upper end of the duct;
 - (iii) a fixed means for extinguishing a fire within the duct;
 - (iv) remote control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in clause (ii) and for operating the fire-extinguishing system, which shall be placed in a position close to the entrance to the galley. Where a multi-branch system is installed, means shall be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and
 - (v) suitably located hatches for inspection and cleaning;
- (c) In addition to complying with subparagraph (b)(ii), galley ventilation ducts shall also comply with paragraph (7).

(14) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the following arrangements shall be tested in accordance with Part 3 of the Fire Test Procedures Code:

- (a) fire dampers, including relevant means of operation;
- (b) duct penetrations through "A" class divisions, except where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding.

Windows and sidescuttles

92. (1) All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which Rule 89(8) and Rule 90(3) apply, shall be constructed so as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

(2) Notwithstanding the requirements of the Tables to Rule 87, the following requirements shall apply:

- (a) all windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle;
- (b) subject to paragraph (3), the fire integrity of windows facing open or enclosed lifeboat and liferaft embarkation areas and of windows situated below such areas in such a position that their failure during a fire would impede the launching of, or embarkation into, lifeboats or liferafts shall be such that any potential fire hazard is kept to a minimum.

(3) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, windows facing life-saving appliances, embarkation and muster areas, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have the fire integrity as required in Tables 5 or 6 to Rule 87. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. Windows located in the ship's side below the lifeboat embarkation areas shall have the fire integrity at least equal to "A-0" class.

Restricted use of combustible materials

93. (1) The following surfaces shall be such that a surface spread of flame of Class I will not be exceeded:

- (a) exposed surfaces in corridors and stairway enclosures;
- (b) within all accommodation spaces, service spaces and control stations:
 - (i) bulkheads, wall and ceiling linings; and
 - (ii) concealed or inaccessible spaces.

(2) Within accommodation spaces, service spaces and control stations the following shall apply:

- (a) the total volume of combustible facings, mouldings, decorations and veneers shall not exceed a volume equivalent to 2.5 mm of veneer on the combined area of walls and ceilings. In the case of ships fitted with an automatic sprinkler, fire alarm and fire detection system complying with Schedule 7, the volume may include some combustible material used for the erection of "C" class divisions;

- (b) (i) veneers used on surfaces and linings to which paragraph (1) applies shall not have a gross calorific value exceeding 45 MJ/m² of surface area for the thickness used as measured in accordance with the method specified in International Standard ISO 1716-1973 or another international standard that is acceptable to the Minister;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, veneers used on surfaces and linings covered by the requirements of paragraph (1) shall have a gross calorific value not exceeding 45 MJ/m² of the area for the thickness used, measured in accordance with ISO standard 1716 “Building Materials – Determination of Calorific Potential”;
- (c) (i) furniture in the corridors and stairway enclosures shall be kept to a minimum;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to 6 seats on each deck in each stairway enclosure, be of restricted fire risk in accordance with an international standard that is acceptable to the Minister and shall not restrict the passenger escape route. The Minister may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition, lockers of non-combustible material, providing storage for safety equipment required by rules or regulations, may be permitted;
- (d) (i) primary deck coverings shall be of approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures in accordance with an international standard that is acceptable to the Minister;
- (iii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures, this being

determined in accordance with Part 2 and Part 6 of the Fire Test Procedures Code;

- (e) waste paper receptacles shall be constructed of non-combustible materials and with solid sides and bottoms.

(3) Within accommodation spaces, service spaces, control stations and machinery spaces the following shall apply:

- (a) (i) all ceilings, linings, grounds, draught stops and insulating materials shall be of non-combustible materials except in respect of:
 - (I) mail rooms and baggage rooms;
 - (II) materials used to insulate refrigerated compartments;
 - (III) subject to clause (ii), materials used to insulate valves associated with cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded;
 - (IV) subject to clause (ii), vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998, vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings, for cold service systems are not required to be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics;
- (b) paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products and, in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, this requirement shall be determined in accordance with Part 2 and Part 5 of the Fire Test Procedures Code.

(4) Linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies on a ship of Class I or Class II shall be of non-combustible materials.

- (5) (a) In the case of a ship of Class I or II constructed on or after 1 July 2008, furniture and furnishings on cabin balconies shall comply with the requirements of subparagraph (b) unless such balconies are protected by a fixed pressure water-spraying and fixed fire detection and fire alarm systems complying with Rule 41(5) and Rule 102(3) of the Merchant Shipping (Fire Protection) (No. 2) Rules 2023 (S.I. No. 380 of 2023).
- (b) (i) Case furniture such as desks, wardrobes, dressing tables, bureaux, or dressers shall be constructed entirely of approved non-combustible materials, except that a

combustible veneer not exceeding 2 mm may be used on the working surface of such articles.

- (ii) Free-standing furniture such as chairs, sofas or tables shall be constructed with frames of non-combustible materials.
- (iii) Draperies, curtains and other suspended textile materials shall have qualities of resistance to the propagation of flame not inferior to those of wool having a mass of 0.8 kg/m², this being determined in accordance with the Fire Test Procedures Code.
- (iv) Upholstered furniture and bedding components shall have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code.

Miscellaneous items of fire protection

94. (1) The following provisions shall apply to all parts of a ship:

- (a) any pipe which penetrates an "A" class division or "B" class division shall be of suitable material having regard to the temperature such divisions are required to withstand;
- (b) pipes intended for oil or other flammable liquids shall be of suitable material having regard to the risk of fire;
- (c) overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to a danger of flooding;
- (d) in spaces where penetration of oil products is possible the exposed surface of insulation shall be impervious to oil or oil vapours;
- (e) in a ship of Class I or Class II, paint lockers and flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Minister;
- (f) in the case of a ship of Class I or Class II constructed on or after 1 February 1992 and before 1 July 1998, helicopter decks shall be of a steel or steel equivalent fire-resistant construction. If the space below the helicopter deck is a high fire risk space, the insulation standard shall be to the satisfaction of the Minister. Each helicopter facility shall have an operations manual, including a description and a checklist of safety precautions, procedures and equipment requirements. Where the Minister permits aluminium or other low melting metal construction that is not made equivalent to steel, the following provisions shall be satisfied:
 - (i) if the platform is cantilevered over the side of the ship, after each fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use;

- (ii) if the platform is located above the ship's deckhouse or similar structure, the following conditions shall be satisfied:
 - (I) the deckhouse top and bulkheads under the platform shall have no openings;
 - (II) all windows under the platform shall be provided with steel shutters;
 - (III) the required fire-fighting equipment shall be to the satisfaction of the Minister;
 - (IV) after each fire on or in close proximity to the platform, the platform shall undergo a structural analysis to determine its suitability for further use;
 - (g) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, helicopter facilities shall be in accordance with IMO Resolution A.855(20) adopted on 27 November 1997.
- (2) The following provisions shall apply to accommodation spaces, service spaces and control stations:
- (a) every air space enclosed behind a ceiling, panel or lining shall be divided longitudinally and transversely by close fitting draught stops which shall be spaced not more than 14m apart and shall be closed at each deck;
 - (b) every ceiling and lining shall be so constructed as to enable a fire patrol to detect any smoke originating in a concealed or inaccessible space without impairing the efficiency of the fire protection of the ship. The Minister may exempt a ship from the requirements of this Rule if the Minister is satisfied that there is no risk of fire originating in such a space;
 - (c) electric space heaters shall be fixed in position and shall be so constructed as to reduce risk of fire to a minimum. No such heater shall be fitted with an element so exposed that clothing, curtains or similar materials can be scorched or set on fire by heat from the element;
 - (d) cellulose-nitrate film shall not be used for cinematograph installations.

Automatic sprinkler, fire detection and fire alarm system and fixed fire detection and fire alarm system

95. (1) In a ship constructed prior to 1 October 1994 there shall be installed in all accommodation spaces, service spaces and control stations throughout each separate main vertical zone or, if a main vertical zone is divided horizontally in accordance with Rule 85(3) into parts, throughout each part vertical zone, either:

- (a) (i) an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements

specified in Schedule 7 and so arranged as to protect all such spaces in the ship; and

- (ii) in a ship the keel of which was laid or which was at a similar stage of construction on or after 1 July 1986, a fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 11, so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within the accommodation spaces; or
- (b) a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 and so arranged as to detect the presence or the signs of a fire and its location in any such spaces.

(2) In the case of a ship of Class I or Class II constructed on or after 1 January 1994, where public spaces span 3 or more open decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the entire main vertical zone containing the space shall be protected throughout with an automatic sprinkler system in compliance with Schedule 7.

(3) A ship of Class I or Class II constructed on or after 1 October 1994 shall be equipped in all service spaces, control stations and accommodation spaces, including corridors and stairways, with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements of Schedule 7 or an approved equivalent sprinkler system to the satisfaction of the Minister. Alternatively, in the case of control stations where water may cause damage to essential equipment, an approved fixed fire-extinguishing system of another type may be fitted. A fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 11 shall be installed and arranged so as to provide smoke detection in service spaces, control stations and accommodation spaces, including corridors and stairways. Smoke detectors are not required to be fitted in private bathrooms and galleys. Spaces having little or no fire risk such as voids, public toilets and similar spaces, are not required to be fitted with an automatic sprinkler system or a fixed fire detection and alarm system.

(4) The Minister may exempt a ship from the requirements of this Rule in respect of any spaces which afford no substantial fire risk or any control station where a requirement is considered unnecessary.

Protection of special category spaces and ro-ro cargo spaces

96. (1) The following provisions shall apply to special category spaces and ro-ro cargo spaces whether above or below the bulkhead deck:

- (a) (i) if it is not practicable to divide such spaces into main vertical zones, equivalent protection shall be obtained by dividing such spaces into horizontal zones. Such a horizontal zone for the purpose of this Rule may include special category spaces or ro-ro cargo spaces on more than one deck provided that the total overall clear height for

vehicles does not exceed 10m. The bulkheads and decks forming the boundaries of such a horizontal zone shall be insulated respectively as required for Category (11) spaces in Tables 1 and 3 to Rule 87;

- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, the boundary bulkheads and decks of special category spaces or ro-ro cargo spaces shall be insulated to "A-60" class standard. Where a category (5), (9) or (10) space as defined in Rule 87 is on one side of the division, the standard may be reduced to "A-0";
 - (iii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, where fuel oil tanks are below a special category space or a ro-ro cargo space, the integrity of the deck between such spaces may be reduced to "A-0" standard;
 - (iv) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, permanent openings in the side plating, the ends or deckhead of open and closed ro-ro cargo spaces shall be so situated that a fire in the cargo space shall not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces;
- (b) the requirements of Rules 89 and 91 for maintaining the integrity of vertical zones shall apply to bulkheads and decks forming the boundaries separating horizontal zones from each other and from the remainder of the ship;
 - (c) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 shall be provided;
 - (d) indicators shall be provided on the navigating bridges which shall show when any access fire door in the boundary of a special category space or ro-ro cargo space is closed;
 - (e) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition. Ventilation ducts, including dampers, shall be of steel and arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire;
 - (f) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, permanent openings in the side plating, the ends or deckhead of special category spaces shall be so situated that a fire in the special category space does not endanger stowage areas and embarkation stations for survival craft, accommodation spaces, service spaces and control stations in superstructures, and deckhouses above the special category spaces.

(2) In addition to paragraph (1), in the case of special category spaces above the bulkhead deck on a ship constructed on or after 1 July 1997 and for ro-ro cargo spaces fitted with a fixed pressure water-spraying system, scuppers shall be fitted so as to ensure that quantities of water accumulating on the deck or decks consequent on the operation of the fixed pressure water spraying system are rapidly discharged directly overboard.

(3) In a ship constructed on or after 1 July 1997, where electrical equipment and wiring is installed in an exhaust ventilation duct it shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

(4) In the case of special category spaces below the bulkhead deck on a ship constructed on or after 1 July 1997, the following provisions shall apply:

- (a) electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted;
- (b) electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Protection of cargo spaces, other than special category spaces and ro-ro cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion

97. In every ship the following provisions shall apply to a cargo space, other than a special category space or ro-ro cargo space containing motor vehicles with fuel in their tanks for their own propulsion:

- (a) (i) a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 or a sample extraction smoke detection system complying with Schedule 12 shall be provided;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 February 1992, the design and arrangements of the system provided in accordance with subparagraph (i) shall be considered in conjunction with the ventilation requirements referred to in paragraph (c) and Rule 9.
- (b) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 or a fixed gas fire extinguishing system complying with the requirements specified in Schedule 10 shall be provided;
- (c) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition. Ventilation ducts, including dampers, shall be of steel;

- (d) in the case of ro-ro cargo spaces of a ship constructed on or after 1 July 1998 and before 1 July 2002:
 - (i) the boundary bulkheads and decks of closed and open ro-ro cargo spaces shall be insulated to “A-60” class standard. Where a category (5), (9) or (10) space, as defined in Rule 87, is on one side of the division, the standard may be reduced to “A-0”. Where fuel oil tanks are below a ro-ro cargo space, the integrity of the deck between such spaces may be reduced to “A-0” standard;
 - (ii) permanent openings in the side plating, the ends or deckhead of open and closed ro-ro cargo spaces shall be so situated that a fire in the cargo space shall not endanger stowage areas and embarkation stations for survival craft and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the cargo spaces;
- (e)
 - (i) electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted;
 - (ii) electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Special arrangements in machinery spaces

98. The following provisions shall apply to machinery spaces:

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) doors in the boundaries of machinery spaces of Category A, other than watertight doors and the fire-screen door referred to in paragraph (d), shall be arranged so that the closure of the door will be assured in the event of fire in the space and the doors shall be provided with closing arrangements which either comply with Rule 89(6) or are provided with power operated closing arrangements operable from the control position required by Rule 71(2); and
- (d) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a lightweight steel fire-screen door in addition to any watertight door. The fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Requirements for passenger ships of Class I or Class II carrying more than 36 passengers and constructed before 1 October 1994

99. (1) This Rule shall apply to a passenger ship of Class I or Class II carrying more than 36 passengers and constructed before 1 October 1994.

- (2) (a) Plans and books required by Rule 76 shall provide information regarding fire protection, fire detection and fire extinction based on guidelines developed by the IMO.
- (b) In accordance with Rule 13(1)(a), a fire patrol shall be maintained, and each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.
- (c) Water fog applicators shall be provided in accordance with Rules 6(9), 10(3)(d) and 14(3).
- (d) Portable foam applicators shall be provided in accordance with Rules 7(4)(b), 10(2)(b) and 10(3)(b).
- (e) Hose nozzles provided shall be of an approved dual-purpose type, that is a spray/jet type, incorporating a shutoff.

(3) Accommodation and service spaces, stairway enclosures and corridors shall be equipped with a smoke detection and alarm system of an approved type and complying with the requirements of Schedule 11. Such a system shall not be required to be fitted in private bathrooms, and spaces having little or no fire risk such as voids and similar spaces. Detectors operated by heat instead of smoke shall be installed in galleys.

(4) Smoke detectors connected to the smoke detection and alarm system shall be fitted above ceilings in stairways and corridors in the areas where ceilings are of combustible construction.

- (5) (a) Hinged fire doors in stairway enclosures, main vertical zone bulkheads and galley boundaries which are normally kept open shall be self-closing and be capable of release from a central control station and from a position at the door.
- (b) A panel shall be placed in a continuously manned central control station to indicate whether the fire doors on stairway enclosures, main vertical zone bulkheads and galley boundaries are closed.
- (c) Exhaust ducts from galley ranges where grease or fat is likely to accumulate and which pass through accommodation spaces or spaces containing combustible materials shall be constructed of "A" class divisions. Each galley range exhaust duct shall be fitted with:
 - (i) a grease trap readily removable for cleaning, unless an alternative grease removal process is fitted;
 - (ii) a fire damper located in the lower end of the duct;
 - (iii) arrangements operable from within the galley for shutting off the exhaust fans;

- (iv) fixed means for extinguishing a fire within the duct;
 - (v) suitably located hatches for inspection and cleaning.
- (d) Only public toilets, lifts, lockers of non-combustible materials providing storage for safety equipment and open information counters may be located within the stairway enclosure boundaries. Other existing spaces within the stairway enclosure shall:
- (i) be emptied, permanently closed and disconnected from the electrical system; or
 - (ii) be separated from the stairway enclosure by the provision of "A" class divisions in accordance with Rule 87. Such spaces may have direct access to stairway enclosures by the provision of "A" class doors in accordance with Rule 87, and subject to a sprinkler system being provided in these spaces. Cabins shall not directly open into the stairway enclosure.
- (e) Spaces other than public spaces, corridors, public toilets, special category spaces, other stairways required by Rule 119(3)(c), open deck spaces and spaces covered by subparagraph (d)(ii) are not permitted to have direct access to stairway enclosures.
- (f) Existing machinery spaces of category (10) as described in Rule 87(3)(b), and existing back offices for information counters which open directly into the stairway enclosure, may be retained, provided that they are protected by smoke detectors and that back offices for information counters contain only furniture of restricted fire risk.
- (g) In addition to the emergency lighting required by Rules 43 and 101 of the Merchant Shipping (Passenger Ship Construction) Rules 1983 (S.I. No. 300 of 1983), Rules 46 and 48 of the Passenger Ship Construction Rules 1985 and Rule 12(5) of the Merchant Shipping (Life-saving Appliances) Rules 2018 (S.I. No. 438 of 2018), the means of escape including stairways and exits shall be marked, at all points of the escape route including angles and intersections, by lighting or photoluminescent strip indicators placed not more than 0.3m above the deck. The marking must enable passengers to identify all routes of escape and readily identify the escape exits. Where electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light, or cut in a lighting strip, will not result in the marking being ineffective. Additionally, all escape route signs and fire equipment location markings shall be of photoluminescent material. The Minister shall ensure that such lighting or photoluminescent equipment have been evaluated, tested and applied in accordance with IMO Resolution A.752(18) adopted on 4 November 1993.
- (h) A general emergency alarm system shall be provided. The alarm shall be audible throughout all the accommodation and normal

crew working spaces and open decks, and its sound pressure level shall comply with the standard in the Code on Alarms and Indicators, which was adopted by the IMO by Resolution A.686(17). The alarm shall continue to function after it has been triggered until it is manually turned off or is temporarily interrupted by a message on the public address system.

- (i) A public address system or other effective means of communication shall be available and audible throughout the accommodation, public and service spaces, control stations and open decks.
- (j) Furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to 6 seats on each deck in each stairway enclosure, be of restricted fire risk, and shall not restrict the passenger escape route. The Minister may permit additional seating in the main reception area within stairway enclosures, if it is fixed, non-combustible, and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition, lockers of non-combustible material, providing storage for safety equipment required by rules or regulations, may be permitted.

(6) Accommodation and service spaces, stairway enclosures and corridors shall be fitted with an automatic sprinkler, fire detection and fire alarm system complying with the requirements of Schedule 7. A sprinkler system is not required to be fitted in private bathrooms and spaces having little or no fire risk such as voids and similar spaces.

- (7) (a) Stairways in accommodation and service spaces shall be of steel frame construction except where the Minister sanctions the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, with positive means of closure at all openings, except that:
 - (i) a stairway connecting only two decks is not required to be enclosed, provided the integrity of the deck is maintained by proper bulkheads or doors in one between-deck space. When a stairway is closed in one between-deck space, the stairway enclosure shall be protected in accordance with Tables 3 and 4 to Rule 87;
 - (ii) stairways may be fitted in the open in a public space, provided they lie wholly within such public space.
- (b) Machinery spaces of Category A shall be fitted with a fixed fire-extinguishing system complying with the requirements of Rule 10.
- (c) Ventilation ducts passing through divisions between main vertical zones shall be equipped with a fail-safe automatic closing fire damper which shall also be capable of being manually closed from each side of the division. In addition, fail-safe automatic closing fire dampers with manual operation from within the enclosure shall be fitted to all ventilation ducts serving both

accommodation and service spaces and stairway enclosures where they pierce such enclosures. Ventilation ducts passing through a main fire zone division without serving spaces on both sides or passing through a stairway enclosure without serving that enclosure shall not be required to be fitted with dampers provided that the ducts are constructed and insulated to A-60 standard and have no openings within the stairway enclosure or in the trunk on the side which is not directly served.

- (d) Special category spaces and ro-ro cargo spaces shall comply with the requirements of Rule 96.
- (e) Fire doors in stairway enclosures, main vertical zone bulkheads and galley boundaries which are normally kept open shall be capable of release from a central control station and from a position at the door.

Ships of Class I, II and II(A) carrying not more than 36 passengers

Rules application to ships of Class I, II and II(A) carrying not more than 36 passengers

100. Rules 101 to 115 inclusive apply to passenger ships of Class I, II and II(A) carrying not more than 36 passengers.

Structure

101. (1) The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material, except that the crowns and casings of machinery spaces of Category A shall be constructed only of steel.

(2) Where any part of the structure is of aluminium alloy, the following requirements shall apply:

- (a) the insulation of aluminium alloy components of "A" or "B" class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an "A" class division and 30 minutes in the case of a "B" class division;
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas shall be such that the temperature rise limitation specified in subparagraph (a) shall apply for 60 minutes duration.

Main vertical zones and horizontal zones

102. (1) The hull, superstructure and deckhouses in the way of accommodation and service spaces shall be subdivided by bulkheads consisting of "A" class divisions into main vertical zones except in respect of special

category spaces or ro-ro cargo spaces to which Rule 113 applies. The mean length of each zone on any one deck above the bulkhead deck shall not exceed 40 m. Steps and recesses shall be kept to a minimum, but any which are necessary shall consist of “A” class divisions. These divisions shall have insulation values in accordance with Tables 1 and 2 to Rule 104, except that where insulation values of “B-0” and “C” appear in Table 1 to Rule 104 the value of “A-0” shall be substituted.

- (2) (a) Any portions of such divisions which extend above the bulkhead deck shall, whenever possible, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck and shall extend from deck to deck and to the ship's shell and, in the case of a deckhouse, to the external plating thereof.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, the length and width of main vertical zones may be extended to a maximum of 48 m in order to bring the ends of main vertical zones to coincide with subdivision watertight bulkheads or in order to accommodate a large public space extending for the whole length of the main vertical zone provided that the total area of the main vertical zone is not greater than 1,600 m² on any deck. The length or width of a main vertical zone is the maximum distance between the furthestmost points of the bulkheads bounding it.

(3) A main vertical zone may, for the purpose of Rule 112, be sub-divided by horizontal “A” class divisions into two or more parts provided that such horizontal divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in Table 2 to Rule 104.

(4) In ships designed for special purposes, such as train services, where the provision of main vertical zone bulkheads would conflict with the purpose for which the ship is intended, the Minister may allow an equivalent means for controlling and limiting a fire to be substituted.

Bulkheads within a main vertical zone

103. (1) Every bulkhead within the accommodation spaces or service spaces that is not required by these Rules to consist of an “A” class division, shall consist of a “B” class or a “C” class division as prescribed in Tables 1 and 2 to Rule 104. All such divisions may be faced with combustible materials in accordance with Rule 110.

(2) All corridor bulkheads, where not required to be “A” class divisions, shall be “B” class divisions, which shall extend from deck to deck except that:

- (a) when continuous “B” class ceilings or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of a material which in thickness and composition meets the requirements of “B” class divisions, but which is required to meet “B” class fire integrity

standards only in so far as is reasonable and practicable in the opinion of the Minister;

- (b) in the case of a ship protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7, a corridor bulkhead of “B” class integrity may terminate at a ceiling in the corridor, provided that such a ceiling is of a material which, in thickness and composition, is acceptable in the construction of “B” class divisions. Notwithstanding the requirements of Rule 104, such bulkheads and ceilings are required to meet “B” class fire integrity standard only in so far as is reasonable and practicable in the opinion of the Minister. All doors and their frames in such bulkheads shall be of non-combustible materials and shall be constructed and erected so as to provide adequate fire resistance to the satisfaction of the Minister.
- (3) (a) Every bulkhead required to be a “B” class division, except a corridor bulkhead, shall extend from deck to deck and to the shell or other boundaries unless continuous “B” class ceilings or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, all bulkheads required to be a “B” class division, except corridor bulkheads prescribed in paragraph (2), shall extend from deck to deck and to the shell or other boundaries unless the continuous “B” class ceilings or linings fitted on both sides of the bulkheads are at least of the same fire resistance as the bulkhead, in which case the bulkhead may terminate at the continuous ceiling or lining.

Fire integrity of bulkheads and decks

104. (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks in these Rules, the minimum fire integrity of bulkheads and decks shall be as set out in paragraphs (2) to (5) and Tables 1 and 2 to this Rule.

(2) Where, due to a particular structural arrangement in a ship, there may be doubt in determining from Tables 1 and 2 the minimum fire integrity and insulation standard of any division, such a standard shall be determined to the satisfaction of the Minister.

(3) The following requirements shall govern the application of Tables 1 and 2 to this Rule:

- (a) Tables 1 and 2 shall apply respectively to the bulkheads and decks separating adjacent spaces;
- (b) for the purpose of determining the appropriate fire integrity and insulation standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1A) to (11A) below. The title of each

category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the Tables:

- (1A) Control stations and similar spaces including:
 - control stations; spaces containing centralised emergency public address systems and equipment,
 - (2A) Corridors including passenger and crew space corridors and lobbies;
 - (3A) Accommodation spaces, excluding stairways, corridors and lobbies;
 - (4A) Stairways, including interior stairways, lifts and escalators and enclosures thereto (other than those wholly contained within the machinery spaces); a stairway that is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door;
 - (5A) Service spaces of low risk, including lockers and storerooms having areas of less than 2m², drying rooms and laundries and, in the case of a ship of Class I or Class II constructed on or after 1 February 1992, lockers and storerooms not having provisions for the storage of flammable liquids and having areas less than 4 m², and drying rooms and laundries;
 - (6A) Machinery spaces of Category A;
 - (7A) Other machinery spaces;
 - (8A) Cargo spaces, including trunkways and hatchways to such spaces, but excluding special category spaces and ro-ro cargo spaces;
 - (9A) Service spaces of high risk, including galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and storerooms having areas of 2m² or greater, workshops, other than those forming part of the machinery spaces and, in the case of a ship of Class I or Class II constructed on or after 1 February 1992, galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and storerooms having areas of 4 m² or greater, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery spaces;
 - (10A) Open decks, including open deck spaces, enclosed promenades having no fire risk, and the air space outside superstructures and deckhouses;
 - (11A) Special category spaces and ro-ro cargo spaces.
- (c) where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases;

- (d) in determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7, or between such zones neither of which is so protected, the higher of the two values given in the Tables shall apply;
 - (e) in determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7, or between such zones both of which are so protected, the lesser of the two values given in the Tables shall apply. Where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the Table shall apply to the division between the zones;
 - (f) where adjacent spaces are of the same numerical category and superscript “a” is specified, a bulkhead or deck of the rating shown in the Tables is only required when such spaces are used for different purposes;
 - (g) bulkheads separating the wheelhouse and chartroom from each other may be “B-0” rating;
 - (h) for the application of Rule 102(1), “B-0” and “C” where appearing in Table 1 shall be read as “A-0”;
 - (i) where an asterisk is specified in the Tables, the division is required to be of steel or equivalent material but is not required to be of “A” class standard. For the application of Rule 102(1), an asterisk where appearing in Table 2, except in the case of categories (8A) and (10A), shall be read as “A-0”.
- (4) Continuous “B” class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.
- (5) The integrity of “A” class divisions shall be maintained at intersections and boundaries.

Table 2
Fire integrity of decks separating adjacent spaces

Space below↓ Space above →	(1A)	(2A)	(3A)	(4A)	(5A)	(6A)	(7A)	(8A)	(9A)	(10A)	(11A)
Control stations (1A)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Corridors (2A)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces (3A)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0
Stairways (4A)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces of low risk (5A)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of Category A (6A)	A-60	A-60	A-60	A-60	A-60	*	A-60	A-30	A-60	*	A-60
Other machinery spaces (7A)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8A)	A-60	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces of high risk (9A)	A-60	A-30 A-0	A-30 A-0	A-30 A-0	A-0	A-60	A-0	A-0	A-0	*	A-30
Open decks (10A)	*	*	*	*	*	*	*	*	*	-	A-0
Special category spaces (11A)	A-60	A-15	A-30 A-0	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

Protection of stairways and lifts in accommodation and service spaces

105. (1) All stairways shall be of steel frame construction except where the Minister may approve the use of other equivalent material, and shall be within enclosures formed of "A" class divisions, except that:

- (a) a stairway connecting only 2 decks is not required to be enclosed on both decks provided that the integrity of the deck is maintained by bulkheads or doors at one between-deck space. When a stairway is closed at one between-deck space, the stairway enclosure shall have the same integrity standard as is required by Table 2 to Rule 104 for the deck which separates the between-deck spaces;
- (b) stairways may be fitted in the open in a public space provided that they lie wholly within such public space.

(2) Every opening in a stairway enclosure shall be provided with a means of closure which shall be permanently attached thereto.

- (3) (a) Every stairway enclosure shall have direct communication with the corridors and be of sufficient area to prevent congestion having regard to the number of persons likely to use it in an emergency. In so far as is practicable, stairway enclosures shall not give direct access to cabins, service lockers or other enclosed spaces containing combustibles in which a fire is likely to originate.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, stairway enclosures shall have direct access with the corridors and be of a sufficient area to prevent congestion, having regard to the number of persons likely to use them in an emergency. Within the perimeter of such stairway enclosures, only public toilets, lockers of non-combustible material providing storage for safety equipment and open information counters are permitted. Only public spaces, corridors, public toilets, special category spaces, other escape stairways required by Rule 119(3)(c) and external areas are permitted to have direct access to these stairway enclosures.

(4) Every lift trunk shall be so fitted as to prevent the passage of smoke and flame from one between-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

Openings in "A" class divisions

106. (1) Where an "A" class division is pierced for the passage of electric cables, pipes, trunks, girders or beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (7).

(2) Where ventilation ducts pass through "A" class divisions the requirements of Rule 108 shall apply.

(3) Except for hatches between special category spaces or ro-ro cargo spaces within a single horizontal zone, or hatches between cargo spaces or stores or baggage spaces, and hatches between such spaces and the weather decks, every opening shall be provided with permanently attached means of closing which shall be at least as effective for resisting fire as the division in which it is fitted.

(4) Every door and door frame in an "A" class division shall be constructed of steel or other equivalent material and the means of securing the door when closed shall provide resistance to fire as well as to the passage of smoke and flame, as far as practicable equivalent to that of the bulkhead in which the door is situated. A watertight door shall not be required to be insulated.

(5) Any door in an "A" class division shall be so constructed that it can be opened and closed by one person from either side of the division.

(6) (a) Every door in a division constructed in compliance with Rules 102(1) and 105(1), except a watertight door or one which is normally locked shut, shall be self-closing and capable of closing against an adverse inclination of up to 3.5 degrees. The speed of door closure shall be controlled so as to prevent undue danger to personnel. All such doors which are held in the open position shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system, except that this requirement shall not apply to watertight doors. Hold-back hooks, not subject to control station release, are not permitted.

(b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, every fire door in main vertical zone bulkheads and stairway enclosures shall satisfy the following requirements:

(i) the door shall be self-closing and be capable of closing with an angle of inclination of up to 3.5 degrees opposing closure, and shall have an approximately uniform rate of closure of no more than 40 s and no less than 10 s with the ship in the upright position;

(ii) remote-controlled sliding or power-operated doors shall be equipped with an alarm that sounds at least 5 s but no more than 10 s before the door begins to move and continue sounding until the door is completely closed. A door designed to re-open upon contacting an object in its path shall re-open sufficiently to allow a clear passage of at least 0.75 m, but no more than 1 m;

(iii) all doors shall be capable of remote and automatic release from a continuously manned central control station, either simultaneously or in groups, and also individually from a position at both sides of the door. Indication must be provided at the fire control panel in the continuously manned central control station whether each of the remote-controlled doors is closed. The release mechanism shall be

- so designed that the door will automatically close in the event of disruption of the control system or central power supply. Release switches shall have an on-off function to prevent automatic resetting of the system. Hold-back hooks not subject to central control station release are prohibited;
- (iv) local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated at least 10 times (fully opened and closed) using the local controls;
 - (v) double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the system;
 - (vi) doors giving direct access to special category spaces which are power-operated and automatically closed are not required to be equipped with alarms and remote-release mechanisms required in clauses (ii) and (iii).
- (c) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, fire doors in main vertical zone bulkheads, galley boundaries and stairway enclosures other than power-operated watertight doors and those which are normally locked, shall satisfy the following requirements:
- (i) the doors shall be self-closing and be capable of closing against an angle of inclination of up to 3.5 degrees opposing closure;
 - (ii) the approximate time of closure for hinged fire doors shall be no more than 40 s and no less than 10 s from the beginning of their movement with the ship in the upright position. The approximate uniform rate of closure for sliding fire doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in the upright position;
 - (iii) the doors shall be capable of remote release from the continuously manned central control station, either simultaneously or in groups and shall also be capable of release individually from a position at both sides of the door. Release switches shall have an on-off function to prevent automatic resetting of the system;
 - (iv) hold-back hooks not subject to central control station release are prohibited;
 - (v) a door closed remotely from the central control station shall be capable of being re-opened at both sides of the door by local control. After such local opening, the door shall automatically close again;
 - (vi) indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each of the remote-released doors are closed;

- (vii) the release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system or main source of electric power;
- (viii) local power accumulators for power-operated doors shall be provided in the immediate vicinity of the doors to enable the doors to be operated after disruption of the control system or main source of electric power at least 10 times (fully opened and closed) using the local controls;
- (ix) disruption of the control system or main source of electric power at one door shall not impair the safe functioning of the other doors;
- (x) remote-released sliding or power-operated doors shall be equipped with an alarm that sounds for at least 5 s but no longer than 10 s after the door is released from the central control station and before the door begins to move and continue sounding until the door is completely closed;
- (xi) a door designed to re-open upon contacting an object in its path shall re-open not more than 1 m from the point of contact;
- (xii) double-leaf doors equipped with a latch necessary to their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the control system;
- (xiii) doors giving direct access to special category spaces which are power-operated and automatically closed are not required to be equipped with the alarms and remote release mechanisms required in clauses (iii) and (x);
- (xiv) the components of the local control system shall be accessible for maintenance and adjusting;
- (xv) power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire, this being determined in accordance with the Fire Test Procedures Code. The control system shall satisfy the following requirements:
 - (I) the control system shall be able to operate the door at the temperature of at least 200°C for at least 60 minutes, served by the power supply;
 - (II) the power supply for all other doors not subject to fire shall not be impaired;
 - (III) at temperatures exceeding 200°C the control system shall be automatically isolated from the power supply and shall be capable of keeping the door closed at temperatures of up to at least 945°C.

(7) Where a space is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 or fitted with a

continuous “B” class ceiling, the closing of openings in decks not forming steps in main vertical zones or bounding horizontal zones shall be closed reasonably tight and such decks shall meet the “A” class integrity requirements in so far as is reasonable and practicable in the opinion of the Minister.

- (8) (a) The requirements for “A” class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, subject to the requirements of Rule 109. The requirements for “A” class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening onto lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the requirements for “A” class integrity of the outer boundaries of the ship shall not apply to exterior doors, except for those in superstructures and deckhouses facing life-saving appliances, embarkation and external muster station areas, external stairs and open decks used for escape routes. Stairway enclosure doors are not required to meet this requirement.

(9) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, all “A” class doors located in stairways, public spaces and main vertical zone bulkheads in escape routes shall be equipped with a self-closing hose port of material, construction and fire resistance that is equivalent to the door into which it is fitted, and shall be a 150 mm square clear opening with the door closed and shall be inset into the lower edge of the door, opposite the door hinges, or in the case of sliding doors, nearest the opening.

Openings in “B” class divisions

107. (1) Where a “B” class division is pierced for the passage of electric cables, pipes, trunks, girders, beams, or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (5). Where ventilation ducts pass through “B” class divisions the requirements of Rule 108(11) shall apply.

- (2) (a) All doors and door frames in “B” class divisions and means of securing them shall provide a method of closure which shall have resistance to fire as far as practicable equivalent to the division, except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 m². When such opening is cut in a door it shall be fitted with a grille made of steel and shall be capable of being manually closed from each side of the door. Doors shall be non-combustible.
- (b) In the case of a ship of Class I or Class II constructed on or after 1 October 1994:

- (i) doors and door frames in “B” class divisions and means of securing them shall provide a method of closure which shall have resistance to fire equivalent to that of the divisions, except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². When such opening is cut in a door, it shall be fitted with a grille made of steel and shall be capable of being manually closed from each side of the door. Doors shall be non-combustible;
- (ii) cabin doors in “B” class divisions shall be of a self-closing type. Hold-backs are not permitted.

(3) The requirements for “B” class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles subject to the requirements of Rule 109. Similarly, the requirements for “B” class integrity shall not apply to exterior doors in superstructures and deckhouses.

(4) A door which separates a cabin from an individual interior sanitary space, such as a shower space, may be constructed of combustible material.

(5) Where an automatic sprinkler, fire alarm and fire detection system complying with Schedule 7 is fitted:

- (a) the closing of openings in decks shall meet the “B” class integrity requirements in so far as is reasonable and practicable;
- (b) openings in corridor bulkheads of “B” class materials shall be protected in accordance with Rule 103.

Ventilation systems

108. (1) Wherever practicable the system of ducts leading from each ventilation fan shall be within one main vertical or horizontal zone.

(2) Where of necessity a ventilation duct passes through a main vertical zone bulkhead, a fail-safe automatic closing fire damper shall be fitted adjacent to the bulkhead. The damper shall also be capable of being manually closed from each side of the bulkhead. The operating position shall be readily accessible and be marked in a red light-reflecting colour. The duct between the bulkhead and the damper shall be of steel or other equivalent material and, if necessary, be insulated to a standard such as to comply with Rule 106(1). The damper shall be fitted with a visible indicator at each operating position showing whether the damper is in the open or shut position.

(3) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by Rule 106(1), to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this Rule, vertical ducts shall be insulated as required by Tables 1 and 2 to Rule 104.

(4) Ducts serving a stairway enclosure shall be taken from the fan room independently of other ducts in the ventilation system and shall not serve any other space.

(5) There shall be provided for every control station situated below deck other than a control station situated in the machinery space, means to ensure ventilation, visibility and freedom from smoke within it so that, in the event of a fire in the ship, the equipment it contains may be operated effectively. Unless a control station is situated on, and has access to, an open deck or is provided with local closing arrangements equally effective to maintain ventilation, visibility and freedom from smoke in the event of a fire in the ship, at least two entirely separate means of supplying air to such control stations shall be provided and the air inlets to these sources of supply shall be so situated that the risk of both drawing in smoke simultaneously is, as far as practicable, eliminated.

(6) Ventilation ducts, except those in cargo spaces, shall be constructed as follows:

- (a) ducts not less than 0.075m^2 in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of subparagraph (c) and of paragraph (8) and (9), ducts of less than 0.075m^2 in sectional area other than vertical ducts referred to in subparagraph (a) shall be constructed of non-combustible materials. Where such ducts penetrate "A" class divisions or "B" class divisions, due regard shall be given to ensuring the fire integrity of the divisions;
- (c) ducts not exceeding 0.02 m^2 in sectional area or 2 m in length are not required to be non-combustible provided that the following conditions are satisfied:
 - (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998, the ducts shall be of a material which has low flame spread characteristics;
 - (iii) the ducts are used only at the terminal ends of the ventilation system;
 - (iv) the ducts are not located closer than 0.6 m along their lengths to penetrations of "A" class divisions or "B" class divisions.

(7) Ducts provided for the ventilation of machinery spaces of Category A, galleys, ro-ro cargo spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either:

- (a) (i) constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and greater respectively and, in the case of such ducts, the widths or diameters of

which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;

- (ii) suitably supported and stiffened;
- (iii) fitted close to the boundaries penetrated with automatic fail-safe fire dampers, which are also capable of being closed manually;
- (iv) insulated to “A-60” standard from the machinery space, galley, ro-ro cargo space or special category space to a point at least 5 m beyond each fire damper;

or

- (b) (i) constructed of steel in accordance with subparagraph (a)(i) and (ii) and
- (ii) insulated to “A-60” standard throughout the accommodation spaces, service spaces or control stations;

so that penetrations of main zone bulkheads or decks shall comply with the requirements of paragraph (2).

(8) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A, galleys, ro-ro cargo spaces or special category spaces unless either:

- (a) (i) where they pass through a machinery space of Category A, galley, ro-ro cargo space or special category space, the ducts are constructed of steel in accordance with subparagraphs (7)(a)(i) and (ii);
- (ii) automatic fail-safe fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated;
- (iii) the integrity of the boundaries of the machinery space, galley, ro-ro cargo space or special category space is maintained at the penetrations;

or

- (b) (i) where they pass through a machinery space of Category A, galley, ro-ro cargo space or special category space, the ducts are constructed of steel in accordance with subparagraphs (8)(a)(i) and (ii); and
- (ii) the ducts are insulated to “A-60” standard within the machinery space, galley, ro-ro cargo space, or special category space;

except that penetrations of main zone bulkheads and decks shall comply with paragraph (2).

(9) Where they pass through accommodation spaces or spaces containing combustible materials, exhaust ducts from galley ranges shall be constructed of “A” class divisions. Every such exhaust duct shall be fitted with:

- (a) a grease trap readily removable for cleaning;

- (b) an automatic fail-safe fire damper located in the lower end of the duct;
- (c) arrangements, operable from within the galley, for shutting off the exhaust fan;
- (d) a fixed means of extinguishing a fire within the duct using either carbon dioxide or a water spray system.

In addition to complying with subparagraph (b), galley ventilation ducts shall also comply with paragraph (7).

(10) Where a ventilation duct of sectional area exceeding 0.02 m^2 passes through an "A" class bulkhead or deck, the opening in the bulkhead or deck shall be lined with a steel sleeve unless the duct, where it passes through the bulkhead or deck, is constructed of steel. At the penetration the sleeve or duct shall comply with the following specifications:

- (a) the duct or sleeve shall have a thickness of at least 3 mm over a length of 900 mm and as far as possible one half of that length shall be on each side of the bulkhead or deck. The duct or sleeve shall be insulated so as to maintain the standard of fire integrity of the deck or bulkhead;
- (b) every duct shall be fitted with a fire damper which is capable of being closed manually from each side of the division unless the Minister determines otherwise. In every duct of sectional area exceeding 0.075 m^2 , the fire damper shall also operate automatically. The manual operating position shall be readily accessible and be marked in a red light-reflecting colour. The damper shall be fitted with a visible indicator showing whether the damper is in the open or shut position. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" class divisions without serving those spaces, provided those ducts have the same fire integrity and insulation value as the bulkheads which they pierce.

(11) Where a ventilation duct of sectional area exceeding 0.02 m^2 passes through a "B" class division, the opening shall be lined with a steel sleeve of 900 mm in length unless the duct where it passes through the division is constructed of steel. One half of this length shall as far as possible be on each side of the division.

(12) In the case of a ship of Class I or Class II constructed on or after 1 July 1998, the following arrangements shall be tested in accordance with Part 3 of the Fire Test Procedures Code:

- (a) fire dampers, including relevant means of operation;
- (b) duct penetrations through "A" class divisions, except where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding.

Windows and sidescuttles

109. (1) All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which Rule 106(8) and Rule 107(3) apply, shall be constructed so as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

(2) Notwithstanding the requirements of Tables 1 and 2 to Rule 104:

- (a) all windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle;
- (b) subject to paragraph (3), the fire integrity of windows facing open or enclosed lifeboat and liferaft embarkation areas and of windows situated below such areas in such a position that their failure during a fire would impede the launching of, or embarkation into, lifeboats or liferafts shall be such that any potential fire hazard is kept to a minimum.

(3) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, windows facing life-saving appliances, embarkation and muster areas, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have the fire integrity as required in Tables 5 or 6 to Rule 87. Where automatic dedicated sprinkler heads are provided for windows, "A-0" windows may be accepted as equivalent. Windows located in the ship's side below the lifeboat embarkation areas shall have the fire integrity at least equal to "A-0" class.

Restricted use of combustible materials

110. (1) The following surfaces shall be such that a surface spread of flame of Class I will not be exceeded:

- (a) exposed surfaces in corridors and stairway enclosures;
- (b) within all accommodation spaces, service spaces and control stations:
 - (i) bulkheads, wall and ceiling linings;
 - (ii) concealed or inaccessible spaces.

(2) Within accommodation spaces, service spaces and control stations the following shall apply:

- (a) the total volume of combustible facings, mouldings, decorations and veneers shall not exceed a volume equivalent to 2.5 mm of veneer on the combined area of walls and ceilings. In the case of ships fitted with an automatic sprinkler, fire detection and fire alarm system complying with Schedule 7, the above volume may include some combustible material used for the erection of "C" class divisions;

- (b) (i) veneers used on surfaces and linings to which paragraph (1) applies shall not have a gross calorific value exceeding 45 MJ/m² of surface area for the thickness used as measured in accordance with the method specified in International Standard ISO 1716-1973 or another international standard that is acceptable to the Minister;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, veneers used on surfaces and linings covered by the requirements of paragraph (1) shall have a gross calorific value not exceeding 45 MJ/m² of the area for the thickness used, measured in accordance with ISO Standard 1716 “Building Materials – Determination of Calorific Potential”;
- (c) (i) furniture in the corridors and stairway enclosures shall be kept to a minimum;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, furniture in stairway enclosures shall be limited to seating. It shall be fixed, limited to 6 seats on each deck in each stairway enclosure, be of restricted fire risk in accordance with an international standard to the satisfaction of the Minister, and shall not restrict the passenger escape route. The Minister may permit additional seating in the main reception area within a stairway enclosure if it is fixed, non-combustible and does not restrict the passenger escape route. Furniture shall not be permitted in passenger and crew corridors forming escape routes in cabin areas. In addition to the above, lockers of non-combustible material, providing storage for safety equipment required by rules or regulations, may be permitted;
- (d) (i) primary deck coverings shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures, and
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures in accordance with an international standard that is acceptable to the Minister,
- (iii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures this being

determined in accordance with Part 2 and Part 6 of the Fire Test Procedures Code;

- (e) waste paper receptacles shall be constructed of non-combustible materials and with solid sides and bottoms.

(3) Within accommodation spaces, service spaces, control stations and machinery spaces the following shall apply:

- (a) (i) all ceilings, linings, grounds, draught stops and insulating materials shall be of non-combustible materials except in respect of:
 - (I) mail rooms and baggage rooms;
 - (II) materials used to insulate refrigerated compartments;
 - (III) subject to clause (ii), materials used to insulate valves associated with cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded;
 - (IV) subject to clause (ii), vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 July 1998, vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings for cold service systems shall not be required to be non-combustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics;
- (b) paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products and, in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, this requirement shall be determined in accordance with Parts 2 and 5 of the Fire Test Procedures Code.

Miscellaneous items of fire protection

111. (1) The following provisions shall apply to all parts of a ship:

- (a) any pipe which penetrates an "A" class or "B" class division shall be of suitable material having regard to the temperature such divisions are required to withstand;
- (b) pipes intended for oil or other flammable liquids shall be of suitable material having regard to the risk of fire;
- (c) overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to a danger of flooding;

- (d) in spaces where penetration of oil products is possible, the exposed surface of insulation shall be impervious to oil or oil vapours;
 - (e) in the case of a ship of Class I or Class II, paint lockers and flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Minister;
 - (f) in the case of a ship constructed on or after 1 February 1992 and before 1 July 1998, helicopter decks shall be of a steel or steel equivalent fire-resistant construction. If the space below the helicopter deck is a high fire risk space, the insulation standard shall be to the satisfaction of the Minister. Each helicopter facility shall have an operations manual, including a description and a checklist of safety precautions, procedures, and equipment requirements. Where the Minister permits aluminium or other low melting metal construction that is not made equivalent to steel, the following provisions shall be satisfied:
 - (i) if the platform is cantilevered over the side of the ship, after each fire on the ship or on the platform, the platform shall undergo a structural analysis to determine its suitability for further use;
 - (ii) if the platform is located above the ship's deckhouse or similar structure, the following conditions shall be satisfied:
 - (I) the deckhouse top and bulkheads under the platform shall have no openings;
 - (II) all windows under the platform shall be provided with steel shutters;
 - (III) the required fire-fighting equipment shall be to the satisfaction of the Minister;
 - (IV) after each fire on or in close proximity to the platform, the platform shall undergo a structural analysis to determine its suitability for further use;
 - (g) in the case of a ship constructed on or after 1 July 1998 and before 1 July 2002, helicopter facilities shall be in accordance with IMO Resolution A.855(20) adopted on 27 November 1997.
- (2) The following provisions shall apply to accommodation spaces, service spaces and control stations:
- (a) every air space enclosed behind a ceiling, panel or lining shall be divided longitudinally and transversely by close fitting draught stops which shall be spaced not more than 14 m apart and shall be closed at each deck;
 - (b) every ceiling and lining shall be so constructed as to enable a fire patrol to detect any smoke originating in a concealed or inaccessible space without impairing the efficiency of the fire protection of the ship. The Minister may exempt a ship from the

requirement of this Rule if the Minister is satisfied that there is no risk of fire originating in such a space;

- (c) electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element;
- (d) cellulose-nitrate film shall not be used for cinematograph installations.

Automatic sprinkler, fire detection and fire alarm system and fixed fire detection and fire alarm system

112. (1) In a ship constructed prior to 1 October 1994 there shall be installed in all accommodation spaces, service spaces and control stations throughout each separate main vertical zone or, if a main vertical zone is divided horizontally in accordance with Rule 102(3) into parts, throughout each part vertical zone either:

- (a) (i) an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 7 and so arranged as to protect all such spaces in the ship;
- (ii) in a ship the keel of which was laid or which was at a similar stage of construction on or after 1 July 1986, a fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 11 so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within the accommodation spaces; or
- (b) a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 and so arranged as to detect the presence or the signs of a fire and its location in any such spaces.

(2) In the case of a ship of Class I or Class II constructed on or after 1 January 1994, where public spaces span 3 or more open decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, the entire main vertical zone containing the space shall be protected throughout with an automatic sprinkler system in compliance with Schedule 7.

(3) In the case of a ship of Class I or Class II constructed on or after 1 October 1994, there shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation spaces, service spaces and control stations, except spaces which afford no substantial fire risk such as void spaces, sanitary spaces and similar spaces, either:

- (a) a fixed fire detection and fire alarm system of an approved type and complying with the requirements of Schedule 11 and so

installed and arranged as to detect the presence of fire in such spaces, or

- (b) an automatic sprinkler, fire detection and fire alarm system of an approved type and complying with the requirements of Schedule 7 or an approved equivalent sprinkler system to the satisfaction of the Minister so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system of an approved type complying with the requirements of Schedule 11 so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

(4) The Minister may exempt a ship from the requirements of this Rule in respect of any spaces which afford no substantial fire risk or any control station where a requirement is considered unnecessary.

Protection of special category spaces and ro-ro cargo spaces

113. (1) The following provisions shall apply to special category spaces and ro-ro cargo spaces whether above or below the bulkhead deck:

- (a) if it is not practicable to divide such spaces into main vertical zones, equivalent protection shall be obtained by dividing such spaces into horizontal zones. Such a horizontal zone for the purpose of this Rule may include special category spaces or ro-ro cargo spaces on more than one deck provided that the total overall clear height for vehicles does not exceed 10 m. The bulkheads and decks forming the boundaries of such a horizontal zone shall be insulated respectively as required for Category (11A) spaces in Tables 1 and 2 to Rule 104;
- (b) the requirements of Rules 106 and 108 for maintaining the integrity of vertical zones shall apply to bulkheads and decks forming the boundaries separating horizontal zones from each other and from the remainder of the ship;
- (c) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 shall be provided;
- (d) indicators shall be provided on the navigating bridge which shall indicate when any access fire door in the boundary of a special category space or ro-ro cargo space is closed;
- (e) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition. Ventilation ducts, including dampers, shall be of steel and arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire;
- (f) in the case of a ship of Class I or Class II constructed on or after 1 July 1998 and before 1 July 2002, permanent openings in the side plating, the ends or deckhead of special category spaces shall be so situated that a fire in the special category space does not

endanger stowage areas and embarkation stations for survival craft, and accommodation spaces, service spaces and control stations in superstructures and deckhouses above the special category spaces.

(2) In addition to paragraph (1), in the case of special category spaces or ro-ro cargo spaces above the bulkhead deck on a ship constructed on or after 1 July 1997, scuppers shall be fitted so as to ensure that quantities of water accumulating on the deck or decks consequent on the operation of the fixed pressure water spraying system are rapidly discharged directly overboard.

(3) In a ship constructed on or after 1 July 1997, where electrical equipment and wiring is installed in an exhaust ventilation duct it shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

(4) In the case of special category spaces below the bulkhead deck on a ship constructed on or after 1 July 1997, the following provisions shall apply:

- (a) electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted;
- (b) electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Protection of cargo spaces, other than special category spaces or ro-ro cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion

114. In every ship the following provisions shall apply to a cargo space, other than a special category space or ro-ro cargo space containing motor vehicles with fuel in their tanks for their own propulsion:

- (a) (i) a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 or a sample extraction smoke detection system complying with Schedule 12 shall be provided;
- (ii) in the case of a ship of Class I or Class II constructed on or after 1 February 1992, the design and arrangements of the system provided in accordance with subparagraph (i) shall be considered in conjunction with the ventilation requirements referred to in paragraph (c) and Rule 9.
- (b) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 or a fixed gas fire-extinguishing system complying with the requirements specified in Schedule 10 shall be provided;

- (c) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition. Ventilation ducts, including dampers, shall be of steel;
- (d) in the case of a ship carrying not more than 36 passengers constructed on or after 1 July 1998 and before 1 July 2002, the boundary bulkheads and decks of closed and open ro-ro cargo spaces shall have a fire integrity as required for category (8A) spaces in Table 1 to Rule 104 and the horizontal boundaries as required for category (8A) spaces in Table 2 to Rule 104.
- (e)
 - (i) electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of flammable vapours shall not be permitted;
 - (ii) electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Special arrangement in machinery spaces

115. The following provisions shall apply to machinery spaces:

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) doors in the boundaries of machinery spaces of Category A, other than watertight doors and the fire-screen door referred to in paragraph (d), shall be arranged so that the closure of the door will be assured in the event of fire in the space. The doors shall be provided with closing arrangements which either comply with Rule 106(6) or are provided with power operated closing arrangements operable from the control position required by Rule 71(2);
- (d) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door. The fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Ships of Class III, IV, V and VI

Application of Rules 117 and 118 to ships of Class III, IV, V and VI

116. Rules 117 and 118 apply to passenger ships of Class III, IV, V and VI.

Structure

117. Notwithstanding the requirements of Rule 118, the hull superstructure, structural bulkheads, decks and deckhouses of every ship of Class III and Class IV shall be constructed of steel. The Minister may exempt any ship wholly or in part from the requirement of this Rule when the ship is constructed of a material other than steel.

Divisions

118. In every ship fitted with internal combustion propulsion machinery or oil-fired boilers the spaces containing such machinery shall be bounded by steel or equivalent material which shall be gastight. The accommodation spaces shall be separated from such machinery spaces by "A" class divisions.

*Ships of Class I, II, II(A), III, IV, V and VI**Means of escape*

119. (1) This Rule applies to passenger ships of Class I, II, II(A), III, IV, V and VI.

(2) Every ship which is not an open or partially decked ship of Class V or Class VI shall be provided with doorways, stairways, ladderways and other ways to provide readily accessible means of escape to the lifeboat and liferaft embarkation decks for all persons in the ship from accommodation spaces, services spaces and other spaces in which the crew is normally employed, other than machinery spaces. The means of escape shall be so designed and constructed as to be capable of being easily used by the persons for whom they are intended. The number, width and continuity of such means of escape shall be sufficient, having regard to the number of persons by whom they may be used.

(3) Notwithstanding the generality of paragraph (2), in every ship of Class I, II and II(A) the following shall be complied with:

- (a) there shall be provided below the bulkhead deck at least 2 means of escape from each watertight compartment or from each similarly restricted space or group of spaces. At least one of the means of escape provided from each such compartment or from each such space or group of spaces shall be independent of watertight doors. One of the means of escape may be dispensed with, in an exceptional case, having regard to the nature and location of spaces and to the number of persons who normally might be accommodated or employed there;
- (b) there shall be provided above the bulkhead deck at least 2 means of escape from each space bounded by main vertical zone bulkheads or from each similarly restricted space or group of spaces;
- (c) (i) at least one of the means of escape required by subparagraphs (a) and (b) shall be by means of a readily accessible enclosed stairway, which shall provide

continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest. However, where only one means of escape is permitted for the purpose of compliance with subparagraph (a), the sole means of escape shall provide satisfactory safe escape;

- (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, at least one of the means of escape required by subparagraphs (a) and (b) shall consist of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks, or to the uppermost weather deck if the embarkation deck does not extend to the main vertical zone being considered. In the latter case, direct access to the embarkation deck by way of external open stairways and passageways shall be provided and shall have emergency lighting in accordance with Rule 12(5) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018), and slip-free surfaces under foot. Boundaries facing external open stairways and passageways forming part of an escape route and boundaries in such a position that their failure during a fire would impede escape to the embarkation deck shall have fire integrity, including insulation values, in accordance with Tables 5 and 6 to Rule 87. The widths, number and continuity of escapes shall be as follows:
 - (I) stairways shall not be less than 900 mm in clear width and shall be fitted with handrails on each side. The minimum clear width of stairways shall be increased by 10 mm for every one person provided for in excess of 90 persons. The maximum clear width between handrails where stairways are wider than 900 mm shall be 1,800 mm. The total number of persons to be evacuated by such stairways shall be assumed to be two thirds of the crew and the total number of passengers in the areas served by such stairways. The width of the stairways shall conform to standards set out in the Annex to IMO Resolution A.757(18);
 - (II) all stairways sized for more than 90 persons shall be aligned fore and aft;
 - (III) doorways and corridors and intermediate landings included in means of escape shall be sized in the same manner as stairways;
 - (IV) stairways shall not exceed 3.5 m in vertical rise without the provision of a landing and shall not have an angle of inclination greater than 45°;

- (V) landings at each deck level shall be not less than 2 m² in area and shall increase by 1 m² for every 10 persons provided for in excess of 20 persons but are not required to exceed 16 m², except for those landings servicing public spaces having direct access onto the stairway enclosure;
- (d) satisfactory protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be provided;
- (e) lifts shall not be considered as forming one of the required means of escape;
- (f) stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape;
- (g) if a radio office has no direct access to a weather deck, 2 means of escape shall be provided from the office. The Minister may permit one of these escapes to be an opening type window or sidescuttle of sufficient size;
- (h)
 - (i) dead-end corridors shall not be permitted to exceed 7 m in length in ships carrying not more than 36 passengers and 13 m in length in ships carrying more than 36 passengers. A dead-end corridor is a corridor or part of a corridor from which there is only one escape route;
 - (ii) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, a corridor, lobby or part of a corridor from which there is only one route of escape is prohibited;
- (i) in special category spaces and ro-ro cargo spaces the number and disposition of the means of escape both below and above the bulkhead deck shall be adequate and, in general, the safety of access to the lifeboat and liferaft embarkation decks shall be at least equivalent to that required by subparagraphs (a), (b), (c), (d) and (e);
- (j) in the case of a ship of Class I or Class II constructed on or after 1 January 1994, where public spaces span 3 or more decks and contain combustibles such as furniture and enclosed spaces such as shops, offices and restaurants, each level within the space shall have 2 means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of subparagraph (c);
- (k) in the case of a ship of Class I or Class II constructed on or after 1 October, 1994, where the Minister has granted dispensation under the provisions of subparagraph (a), this sole means of escape shall provide safe escape. However, stairways shall not be less than 800 mm in clear width with handrails on both sides;
- (l) in the case of a ship of Class I and Class II constructed on or after 1 October 1994, in addition to the emergency lighting required by Rules 43 and 101 of the Merchant Shipping (Passenger Ship Construction) Rules 1983 (S.I. No. 300 of 1983), Rules 46 and

48 of the Passenger Ship Construction Rules 1985 and Rule 12(5) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018), the means of escape including stairways and exits, shall be marked by lighting or photoluminescent strip indicators placed not more than 0.3 m above the deck at all points of the escape route, including angles and intersections. The marking must enable passengers to identify all the routes of escape and readily identify the escape exits. If electric illumination is used, it shall be supplied by the emergency source of power and it shall be so arranged that the failure of any single light or cut in a lighting strip will not result in the marking being ineffective. Additionally, all escape route signs and fire equipment location markings shall be of photoluminescent material or marked by lighting. The Minister shall ensure that such lighting or photoluminescent equipment have been evaluated and tested in accordance with the guidelines in IMO Resolution A.752(18).

- (m) in the case of a passenger ship of Class I or Class II carrying more than 36 passengers constructed on or after 1 July 1998, the requirements of subparagraph (l) and Rule 99(5)(g) shall also apply to the crew accommodation areas.

(4) In every ship of Class III, IV, V and VI, not being an open or partially-decked ship of Class V or Class VI, such means of escape shall lead to an open deck of sufficient area, having regard to the number of persons which the ship may carry.

(5) Every ship of Class V and Class VI, being an open or partially-decked ship, shall be provided with readily accessible means of escape from all enclosed spaces in the ship. Such means of escape shall be sufficient in number and width, having regard to the number of persons who may be in the said spaces.

(6) In every ship of Class I, II and II(A), suitable signs shall be displayed in passageways and stairways indicating the direction of escape routes to passenger muster stations. Such signs shall be continuously illuminated and shall be adequate in number and distribution. They shall be capable of being illuminated by the ship's emergency lighting system.

(7) In every ship, the means of escape from any public room that may be used for the purpose of concerts, cinema shows and similar forms of entertainment shall be adequate, having regard to the number of persons who may be in the audience, and the seating shall be arranged in rows to ensure free access to the exits. When in any such public room subdued lighting is used, the exits shall be clearly marked with illuminated signs and any doors shall be constructed to open outwards.

(8) In the machinery spaces in every ship of Class I, Class II and Class II(A) there shall be provided from each machinery space 2 means of escape in compliance with the following provisions:

- (a) where the space is below the bulkhead deck the 2 means of escape shall consist of either:

- (i) two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of those ladders shall be provided with continuous fire shelter from the lower part of the space to a safe position outside the space; or
 - (ii) one steel ladder leading to a door in the upper part of the space from which access is provided to such embarkation deck and, additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides a safe escape route to the lifeboat and liferaft embarkation deck;
- (b) where the space is above the bulkhead deck, the 2 means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such escapes require the use of ladders, these shall be of steel;
 - (c) in a ship of less than 1,000 tons, the Minister may permit one of the means of escape required by this paragraph to be dispensed with having regard to the width and disposition of the upper part of the machinery space. In a ship of 1,000 tons or greater the Minister may permit one of the means of escape required by this paragraph to be dispensed with provided that either a door or a steel ladder provides a safe escape route to the embarkation deck, having regard to the nature and location of the space, and whether persons are normally employed in that space;
 - (d) in the case of a ship of Class I or Class II constructed on or after 1 October 1994, 2 means of escape shall be provided from a machinery control room located within a machinery space, at least one of which will provide continuous fire shelter to a safe position outside the machinery space;

(9) In the machinery space in every ship of Class III, Class IV, Class V or Class VI, which is decked in way of the machinery space, there shall be provided from each engine room, shaft tunnel and boiler room 2 means of escape as widely separated as practicable. The 2 means of escape shall consist of 2 sets of steel ladders leading to separate doors in the casing or elsewhere from which there is access to the lifeboat or liferaft embarkation deck or decks. In any such ship the Minister may permit one of the means of escape required by this paragraph to be dispensed with having regard to the nature and location of the space and whether persons are normally employed in that space.

(10) In every ship one of the means of escape from machinery spaces where the crew is normally employed shall avoid access to any special category spaces or ro-ro cargo spaces.

Means of escape – Requirements applicable to Class I and Class II ro-ro passenger ships

- 120.(1)(a) This Rule applies to all Class I and Class II ro-ro passenger ships.
- (b) Handrails or other handholds shall be provided in all corridors along the entire escape route, so that a firm handhold is available every step of the way, where possible, to the assembly stations and embarkation stations. Such handrails shall be provided on both sides of longitudinal corridors greater than 1.8 m in width and transverse corridors greater than 1m in width. Particular attention shall be paid to the need to be able to cross lobbies, atriums and other large open spaces along escape routes. Handrails and other handholds shall be of such strength as to withstand a distributed horizontal load of 750 N/m applied in the direction of the centre of the corridor or space, and a distributed vertical load of 750 N/m applied in the downward direction. The two loads are not required to be applied simultaneously.
- (c) Escape routes shall not be obstructed by furniture and other obstructions. With the exception of tables and chairs which may be cleared to provide open space, cabinets and other heavy furnishings in public spaces and along escape routes shall be secured in place to prevent shifting where the ship rolls or lists. Floor coverings shall also be secured in place. When the ship is underway, escape routes shall be kept clear of obstructions such as cleaning carts, bedding, luggage and boxes containing goods.
- (d) (i) Escape routes shall be provided from every normally occupied space in the ship to an assembly station. These escape routes shall be arranged so as to provide the most direct route possible to the assembly station and, subject to clause (ii), shall be marked with symbols related to life-saving appliances and arrangements adopted by the IMO by Resolution A.760(18) in its updated version.
- (ii) In the case of ships constructed on or after 1 January 2019 or ships that undergo repairs, alterations, modifications and outfitting on or after that date, the escape routes referred to in clause (i) shall be marked with escape route signs and equipment location markings in accordance with IMO Resolution A.1116(30) in its updated version.
- (e) Where enclosed spaces adjoin an open deck, openings from the enclosed space to the open deck shall, where practicable, be capable of being used as an emergency exit.
- (f) Decks shall be sequentially numbered, starting with “1” at the tank top or lowest deck. These numbers shall be prominently displayed at stair landings and lift lobbies. Decks may also be named, but the deck number shall always be displayed with the name.
- (g) Simple “mimic” plans showing the “you are here” position and escape routes marked by arrows shall be prominently displayed

on the inside of each cabin door and in public spaces. The plan shall show the directions of escape and shall be properly oriented in relation to its position on the ship.

- (h) Cabin and stateroom doors shall not require keys to unlock them from inside the room. Neither shall there be any doors along any designed escape route which require keys to unlock them when moving in the direction of escape.

(2) The following requirements apply to a Class I or Class II ro-ro passenger ship constructed on or after 1 July 1997:

- (a) the lowest 0.5 m of bulkheads and other partitions forming vertical divisions along escape routes shall be able to sustain a load of 750 N/m to allow them to be used as walking surfaces from the side of the escape route with the ship at large angles of heel;
- (b) the escape route from cabins to stairway enclosures shall be as direct as possible, with a minimum number of changes in direction. It shall not be necessary to cross from one side of the ship to the other to reach an escape route. It shall not be necessary to climb more than 2 decks up or down in order to reach an assembly station or open deck from any passenger space;
- (c) external routes shall be provided from open decks, referred to in subparagraph (b), to the survival craft embarkation stations.

(3) In the case of a Class I or Class II ro-ro passenger ship constructed on or after 1 July 1999, escape routes shall be evaluated by an evacuation analysis early in the design process. The analysis shall be used to identify and eliminate, as far as practicable, congestion which may develop during an abandonment, due to normal movement of passengers and crew along escape routes, including the possibility that crew may need to move along these routes in a direction opposite to the movement of passengers. In addition, the analysis shall be used to demonstrate that escape arrangements are sufficiently flexible to provide for the possibility that certain escape routes, assembly stations, embarkation stations or survival craft may not be available as a result of a casualty.

PART 7

STRUCTURAL FIRE PROTECTION

Ships other than Passenger Ships or Tankers to which Part 8 applies

Ships of Class VII, VIII, VIII(A), IX and IX(A) and certain Tankers of Class VII(T), VIII(T), VIII(A)(T) and IX(A)(T) of 500 tons and greater

Application of Rules 122 to 135

121. Rules 122 to 135 shall apply to ships of Class VII, VIII, VIII(A), IX and IX(A) of 500 tons or greater and to tankers of Class VII(T), VIII(T),

VIII(A)(T), IX(A)(T) of 500 tons or greater, other than tankers to which Part 8 applies.

Structure

122. (1) The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material except that the crowns and casings of machinery spaces of Category A shall be constructed only of steel.

(2) Where any part of the structure is of aluminium alloy, the following requirements shall apply:

- (a) the insulation of aluminium alloy components of “A” or “B” class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” class division and 30 minutes duration in the case of a “B” class division;
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas shall be such that the temperature rise limitation specified in subparagraph (a) shall apply for 60 minutes duration.

Method of fire protection

123. One of the following methods of protection shall be adopted in the accommodation and service spaces:

- (a) Method IC — the construction of all internal divisional bulkheading shall be of non-combustible “B” or “C” class divisions without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by Rule 133; or
- (b) Method IIC — an automatic sprinkler, fire detection and fire alarm system as required by Rule 133 shall be fitted for the detection and extinction of fire in all spaces in which fire might be expected to originate with no restriction on the type of internal divisional bulkheading; or
- (c) Method IIIC — a fixed fire detection and fire alarm system as required by Rule 133 shall be fitted in all spaces in which a fire might be expected to originate with no restriction on the type of internal divisional bulkheading, except that in no case shall the area of any accommodation space or spaces bounded by continuous “A” or “B” class divisions exceed 50 m² subject to the requirements of Rule 124(4).

Bulkheads within accommodation spaces, service spaces and control stations

124. (1) All bulkheads which are required to be “B” class divisions shall extend from deck to deck and to the shell or other boundaries, unless continuous “B” class ceilings or linings are fitted on both sides of the bulkhead in which case the bulkhead may terminate at the continuous ceiling or lining.

(2) In ships where Method IC is adopted, all bulkheads which are required by this Part to be either “A” or “B” class divisions, shall be “C” class divisions.

(3) In ships where Method IIC is adopted, there shall be no restriction on the construction of bulkheads which are not required by this Part to be “A” or “B” class divisions except where “C” class bulkheads are required in accordance with Table 1 to Rule 125.

(4) In ships where Method IIIC is adopted, there is no restriction on the construction of bulkheads which are not required to be “A” or “B” class divisions except where “C” class bulkheads are required in accordance with Table 1 to Rule 125. In no case shall the area of any accommodation space or spaces bounded by continuous “A” or “B” class divisions exceed 50 m² provided that the Minister may permit this area to be exceeded in public spaces.

Fire integrity of bulkheads and decks

125. (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this Part, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 1 and 2 to this Rule.

(2) The following requirements shall govern application of Tables 1 and 2:

(a) Tables 1 and 2 shall apply respectively to the bulkheads and decks separating adjacent spaces;

(b) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. Where the contents and use of a space are such that there may be doubt as to its classification for the purpose of this Rule, it shall be treated as a space within the relevant category having the most stringent boundary requirements. The number in parentheses preceding each category refers to the applicable column or row in the Tables:

(1) control stations;

(2) corridors, including lobbies;

(3) accommodation spaces, excluding stairways, corridors and lobbies;

(4) stairways, including:

interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto; a stairway which is enclosed only at one

level shall be regarded as part of the space from which it is not separated by a fire door;

- (5) service spaces of low risk including:
 - (a) lockers and store-rooms having an area of less than 2m², drying rooms and laundries;
 - (b) in the case of a ship of 500 tons and greater of Class VII or Class VIII, and a ship of Class VII(T) or VIII(T) constructed on or after 1 February 1992, other than a tanker to which Part 8 applies, lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m², drying rooms and laundries;
- (6) machinery spaces of Category A;
- (7) machinery spaces other than machinery spaces of Category A;
- (8) cargo spaces, including trunkways and hatchways to such spaces, but excluding spaces in category (11);
- (9) service spaces of high risk including:
 - (a) galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 m² or greater, workshops other than those forming part of the machinery spaces;
 - (b) in the case of a ship of 500 tons and greater of Class VII or Class VIII, and a ship of Class VII(T) or Class VIII(T), other than a tanker to which Part 8 applies constructed on or after 1 February 1992:

galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 4 m² or greater, spaces for the storage of flammable liquids, and workshops other than those forming part of the machinery spaces;
- (10) open decks, including:

open deck spaces and enclosed promenades having no fire risk; air spaces (the space outside superstructures and deckhouses);
- (11) ro-ro cargo spaces, other than cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion;
- (c) continuous "B" class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division;
- (d) external boundaries which are required in Rule 122 to be of steel or other equivalent material may be pierced for the fitting of

windows and sidescuttles. Similarly, in such boundaries doors may be of materials to the satisfaction of the Minister;

- (e) the integrity of “A” class divisions shall be maintained at the intersections and boundaries of such divisions;
- (f) (i) where superscripts “a” to “i” inclusive occur in Tables 1 and 2, the following shall apply:
 - superscripts:
 - a no special requirements are imposed upon bulkheads in Method IIC fire protection (that is bulkheads may be combustible);
 - b no special requirements are imposed upon bulkheads in Method IIIC fire protection (that is bulkheads may be combustible) except that “A” class bulkheads or “B” class bulkheads shall be provided between spaces or groups of spaces of 50 m² and greater in area;
 - c Rule 126 applies;
 - d where spaces are of the same numerical category and superscript d appears, a bulkhead or deck of the rating shown in the Tables is only required when the adjacent spaces are for a different purpose. A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an “A-0” bulkhead;
 - e bulkheads separating the wheelhouse, chartroom and radio office from each other may be “B-O” standard;
 - f spaces for the storage of gas cylinders containing the fire extinguishing medium for cargo spaces shall not be located adjacent to such cargo spaces;
 - g for cargo spaces in which dangerous goods are intended to be carried, Rule 152(5)(m) of Part 9 applies;
 - h bulkheads and decks separating ro-ro cargo spaces shall be capable of being closed reasonably gastight and such divisions shall have “A” class integrity in so far as is reasonable and practicable in the opinion of the Minister;
 - i fire insulation is not required to be fitted if the machinery space in category (7) has little or no fire risk in the opinion of the Minister;
 - (ii) where an asterisk appears in the Tables, the division is required to be of steel or other equivalent material but is not required to be an “A” class division.

Table 2
Fire integrity of decks separating adjacent spaces

Spaces below ↓ Spaces above →	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0	*	A-60
Corridors (2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-30
Service spaces of low risk (5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of Category A (6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ⁱ	A-30	A-60	*	A-60
Other machinery spaces (7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces (8)	A-60 ^f	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces of high risk (9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 ^d	*	A-30
Open decks (10)	*	*	*	*	*	*	*	*	*	—	*
Ro-Ro cargo spaces (11)	A-60 ^f	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* ^h

Protection of stairways and lifts in accommodation and service spaces

126. (1) Every stairway within accommodation spaces, service spaces and control stations shall be constructed of steel except where the Minister may approve the use of other equivalent material. Every such stairway and lift shall lie respectively within an enclosure or trunk constructed of "A" class divisions of "A-0" standard except that an isolated stairway serving only 2 decks shall only be required to be enclosed at one level by either "A" class divisions of "A-0" standard or "B" class divisions of "B-0" standard provided that the fire integrity of any bulkhead which separates a stairway from either a machinery space of Category A or a ro-ro cargo space shall be determined by reference to Table 1 to Rule 125.

(2) Every opening in the stairway enclosure and lift trunk shall be provided with a means of closure which shall be permanently attached thereto and which shall comply with the requirements of Rule 127 or Rule 128 whichever is applicable.

Openings in "A" class divisions

127. (1) Where an "A" class division is pierced for the passage of electric cables, pipes, trunks, girders or beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

(2) The construction of all doors and frames in "A" class bulkheads, with the means of securing the doors when closed, shall provide resistance to fire as well as to the passage of smoke and flames, as far as is reasonably practicable, equivalent to that of the bulkheads in which the doors are situated.

(3) Every door in an "A" class bulkhead shall be so constructed that it can be opened and closed by one person from either side of the division.

(4) Every door in an "A" class bulkhead which forms part of a stairway enclosure or lift trunk serving accommodation spaces, service spaces or control stations and every door in a casing of a machinery space of Category A shall be self-closing.

(5) Hold-back arrangements may be fitted to doors to which paragraph (4) refers provided that such arrangements:

- (a) have remote release fittings of a type that in the event of disruption of the control system will automatically close the doors;
- (b) will permit each door to be closed manually.

(6) Doors fitted in boundary bulkheads of machinery spaces of Category A shall be reasonably gastight and self-closing.

(7) Watertight doors are not required to be insulated.

(8) Where ventilation ducts pass through "A" class divisions the requirements of Rule 129 shall apply.

Openings in "B" class divisions

128. (1) Where a "B" class division is pierced for the passage of electric cables, pipes, trunks, girders or beams, or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

(2) The construction of all doors and door frames in "B" class bulkheads shall provide resistance to fire as well as the passage of flame, as far as is reasonably practicable, equivalent to that of the bulkheads in which the doors are situated.

(3) The number of ventilation openings in "B" class divisions shall be kept to a minimum and shall be provided as far as is reasonably practicable only in the lower part of a door and fitted with a grille constructed of steel or under a door except that such openings shall not be provided in a door in a "B" class division forming a stairway enclosure. The net area of any such opening or openings shall not exceed 0.05 m² and in no case shall a gap under a door exceed 25 mm. The grille shall be capable of being manually closed from each side of the door.

(4) Every door in a "B" class bulkhead which forms a stairway enclosure or part thereof shall be self-closing.

(5) Hold-back arrangements may be fitted to doors to which paragraph (4) refers provided that such arrangements:

- (a) have remote release fittings of a type that in the event of disruption of the control system will automatically close the doors;
- (b) will permit each door to be closed manually.

Ventilation systems

129. (1) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by Rule 127, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this Rule, vertical ducts shall be insulated as required by Tables 1 and 2 to Rule 125.

(2) Ducts serving a stairway enclosure shall be taken from the fan room independently of other ducts in the ventilation system and shall not serve any other space.

(3) There shall be provided for every control station situated below deck, other than a control station in the machinery space, means to ensure ventilation, visibility and freedom from smoke within it so that in the event of a fire in the ship, the equipment it contains may be operated effectively. Unless the control station is situated on, and has access to, an open deck or is provided with local closing arrangements equally effective to maintain ventilation, visibility and freedom from smoke in the event of a fire in the ship, there shall be provided at least two entirely separate means of supplying air to such a control station and

the air inlets to these sources of supply shall be so situated that the risk of both drawing in smoke simultaneously is, as far as practicable, eliminated.

(4) Ventilation ducts, except those in cargo spaces, shall be constructed as follows:

- (a) ducts not less than 0.075 m² in sectional areas and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of subparagraph (c) and of paragraphs (5) and (6), ducts of less than 0.075 m² in sectional area other than vertical ducts referred to in subparagraph (a) shall be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class divisions, the fire integrity of the divisions shall be maintained;
- (c) ducts not exceeding 0.02 m² in sectional area nor 2 m in length are not required to be non-combustible provided that the following conditions are satisfied:
 - (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) subject to Rule 145(4)(c)(ii), in the case of a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 July 1998, other than tankers to which Part 8 applies, the ducts are of a material which has low flame spread characteristics;
 - (iii) the ducts are used only at the terminal ends of the ventilation system;
 - (iv) the ducts are not located closer than 0.6 m along their length to penetrations of "A" or "B" class divisions.

(5) Ducts provided for the ventilation of machinery spaces of Category A, galleys, ro-ro cargo spaces or cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either –

- (a) (i) constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and greater respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;
- (ii) suitably supported and stiffened;
- (iii) fitted close to the boundaries penetrated with automatic fire dampers, which are also capable of being closed manually;
- (iv) insulated to "A-60" standard from the machinery space, galley, ro-ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their

own propulsion to a point at least 5 m beyond each fire damper; or

- (b) (i) constructed of steel in accordance with subparagraphs (a)(i) and (ii) of this paragraph; and
- (ii) insulated to “A-60” standard throughout the accommodation spaces, service spaces or control stations.

(6) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A, galleys, ro-ro cargo spaces or cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion unless either —

- (a) (i) where they pass through a machinery space of Category A, galley, ro-ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the ducts are constructed of steel in accordance with subparagraphs (5)(a)(i) and (ii);
- (ii) automatic fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated;
- (iii) the integrity of the boundaries of the machinery space, galley, ro-ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion is maintained at the penetrations;

or

- (b) (i) where they pass through a machinery space of Category A, galley, ro-ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the ducts are constructed of steel in accordance with subparagraphs (5)(a)(i) and (ii);
- (ii) the ducts are insulated to “A-60” standard within the machinery space galley, ro-ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

(7) Exhaust ducts from galley ranges, where they pass through accommodation spaces or spaces containing combustible materials, shall be constructed of “A” class divisions. Every such exhaust duct shall be fitted with:

- (a) a grease trap readily removable for cleaning;
- (b) an automatic fail-safe fire damper located in the lower end of the duct;
- (c) arrangements, operable from within the galley, for shutting off the exhaust fan;
- (d) a fixed means of extinguishing a fire within the duct using either carbon dioxide, or a water spray system.

In addition to compliance with subparagraph (b), galley ventilation ducts shall also comply with paragraph (5).

(8) Where a ventilation duct of sectional area exceeding 0.02 m² passes through an “A” class bulkhead or deck, the opening in the bulkhead or deck shall be lined with a steel sleeve unless the duct, where it passes through the bulkhead or deck, is constructed of steel. At the penetration, the sleeve or duct shall comply with the following specification:

- (a) the duct or sleeve shall have a thickness of at least 3 mm over the length of 900 mm and as far as possible one half of that length shall be on each side of the bulkhead or deck. The duct or sleeve shall be insulated so as to maintain the standard of fire integrity of the bulkhead or deck;
- (b) every duct shall be fitted with a fire damper which is capable of being closed manually from each side of the division unless the Minister determines otherwise. In every duct of sectional area exceeding 0.075 m², the fire damper shall also operate automatically. The manual operating position shall be readily accessible and be marked in a red light-reflecting colour. The damper shall be fitted with a visible indicator showing whether the damper is in the open or shut position. Fire dampers are not required, however, where ducts pass through spaces surrounded by “A” class divisions without serving those spaces, provided that those ducts have the same fire integrity and insulation value as the divisions which they pierce. Where divisions have differing “A” class standards, the ducts shall be of the higher standard.

(9) Where a ventilation duct of sectional area exceeding 0.02 m² passes through a “B” class division, the opening shall be lined with a steel sleeve of 900 mm in length unless the duct, where it passes through the division, is constructed of steel. One half of this length shall as far as possible be on each side of the division.

(10) Subject to Rule 145(4)(c)(ii), in the case of a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 July 1998, other than tankers to which Part 8 applies, the following arrangements shall be tested in accordance with Part 3 of the Fire Test Procedures Code:

- (a) fire dampers, including relevant means of operation;
- (b) duct penetrations through “A” class divisions. Where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding, the test is not required.

Details of construction

130. (1) Where Method IC is adopted, ceilings, linings, draught stops and their associated grounds in accommodation and service spaces and control stations shall be non-combustible.

(2) Where Method IIC or Method IIIC is adopted, ceilings, linings, draught stops and their associated grounds in corridors and stairway enclosures serving accommodation and service spaces and control stations shall be non-combustible.

Restricted use of combustible materials

131. (1) All exposed surfaces in corridors and stairway enclosures and surfaces including grounds in concealed or inaccessible spaces within accommodation and service spaces and control stations shall be such that a surface spread of flame of Class I is not exceeded or, in the case of a ship constructed on or after 1 July 1998, they shall have low flame-spread characteristics.

- (2) (a) Primary deck coverings in accommodation and service spaces and control stations shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures.
- (b) Subject to Rule 147(2)(b), in the case of a ship constructed on or after 1 July 1998 of Class VII, Class VIII, Class VII(T) or Class VIII(T), other than a tanker to which Part 8 of these Rules applies, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures, this being determined in accordance with Annex 1, Part 6 of the Fire Test Procedures Code.
- (3) (a) Paints, varnishes and other finishes used on exposed surfaces within accommodation and service spaces, control stations and machinery spaces shall not contain nitrocellulose or other highly flammable base products and shall not be capable of producing excessive quantities of smoke. Such surfaces, except where otherwise required by these Rules, shall be such that a surface spread of flame of Class 2 will not be exceeded, provided that these requirements shall not apply to furniture, furnishings, machinery and similar items.
- (b) Subject to Rule 147(3)(b), in the case of a ship constructed on or after 1 July 1998 of Class VII, Class VIII, Class VII(T) or Class VIII(T), other than a tanker to which Part 8 of these Rules applies, paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with Annex 1, Parts 2 and 5 of the Fire Test Procedures Code.
- (4) (a) Insulating materials shall be of non-combustible materials except in respect of:
 - (i) cargo spaces;
 - (ii) refrigerated compartments;
 - (iii) valves associated with hot and cold service systems, provided that their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded or, in the case of a ship constructed on or after 1 July 1998, they shall have low flame-spread characteristics;

- (iv) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded.
- (b) (i) Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer not exceeding 2 mm in thickness within any such space except corridors, stairway enclosures and control stations, where the veneer shall not exceed 1.5 mm in thickness.
- (ii) In the case of a ship constructed on or after 1 February 1992 of Class VII, Class VIII, Class VII(T) or Class VIII(T), other than a tanker to which Part 8 of these Rules apply, where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer with a calorific value not exceeding 45 MJ/m² of the area for the thickness used.
- (iii) In the case of a ship constructed on or after 1 July 1998 of Class VII, Class VIII, Class VII(T) or Class VIII(T), other than a tanker to which Part 8 of these Rules applies, where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer with a gross calorific value not exceeding 45 MJ/m² of the area for the thickness used, measured in accordance with ISO standard 1716 "Building Materials – Determination of Calorific Potential".
- (c) In the case of a ship constructed on or after 1 February 1992 of Class VII, Class VIII, Class VII(T) or Class VIII(T), other than a tanker to which Part 8 of these Rules applies, the total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space bounded by non-combustible bulkheads, ceilings and linings shall not exceed a volume equivalent to a 2.5 mm veneer on the combined area of the walls and ceilings.

Miscellaneous items of fire protection

132. (1) Any pipe which penetrates an "A" or "B" class division shall be of suitable material having regard to the temperature such divisions are required to withstand.

(2) In accommodation spaces, service spaces or control stations pipes intended to convey oil or other flammable liquids shall be of a suitable material having regard to the risk of fire.

(3) Overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to danger of flooding.

(4) Electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be

constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element.

(5) Cellulose-nitrate film shall not be used in cinematograph installations.

(6) All waste paper receptacles shall be constructed of non-combustible materials with solid sides and bottoms.

(7) In spaces where penetration of oil products is possible, the exposed surface of insulation materials shall be impervious to oil or oil vapours.

(8) Every air space enclosed behind a ceiling, panel or lining within accommodation spaces, service spaces and control stations shall be divided by close fitting draught stops which shall be spaced not more than 14 m apart and shall be closed at each deck.

(9) In the case of a ship constructed on or after 1 February 1992:

- (a) for the protection of cargo tanks carrying crude oil and petroleum products having a flashpoint not exceeding 60°C, materials readily rendered ineffective by heat shall not be used for valves, fittings, tank opening covers, cargo vent piping and cargo piping so as to prevent the spread of fire to the cargo;
- (b) paint lockers and flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Minister.

Fixed fire detection and fire alarm system, and automatic sprinkler, fire detection and fire alarm system

133. (1) In ships in which Method IC is adopted, a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

(2) In ships in which Method IIC is adopted, an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 7 shall be so installed and arranged as to protect accommodation spaces, galleys and other service spaces, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces. In addition, a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

(3) In ships in which Method IIIC is adopted, a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces. Notwithstanding the foregoing exception, smoke detection and manually operated call points shall be installed in all corridors, stairways and escape routes.

Special arrangements in machinery spaces

134. The following provisions shall apply to machinery spaces:

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery spaces boundaries;
- (c) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door. The fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Means of escape

135. (1) In every ship, stairways and ladderways shall be arranged so as to provide ready means of escape to the lifeboat and liferaft embarkation deck from all accommodation spaces, service spaces and other spaces in which the crew are normally employed. In particular the following shall be complied with:

- (a) at all levels of accommodation there shall be provided at least 2 widely separated means of escape from each restricted space or group of spaces;
- (b) below the lowest open deck such escapes shall be by means of stairways except that one of these stairways may be replaced by a trunked vertical ladder;
- (c) above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof;
- (d) one of the means of escape may be dispensed with in an exceptional case having regard to the nature and location of the space and to the number of persons who normally might be accommodated or employed there;
- (e) no dead-end corridors having a length greater than 7 m shall be permitted. A dead-end corridor is a corridor or part of a corridor from which there is only one escape route;
- (f) the width and continuity of the means of escape shall be to the satisfaction of the Minister;
- (g) where a radio office has no direct access to the open deck, 2 means of escape from such office shall be provided. The Minister may permit one of these escapes to be an opening type window or sidescuttle of sufficient size.

(2) In all cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion where the crew is normally employed, the number and locations of escape routes to the open deck shall be to the satisfaction of the Minister but shall in no case be less than 2 and shall be as widely separated as possible.

(3) In every ship 2 means of escape shall be provided from each machinery space of Category A. In particular, one of the following provisions shall be complied with:

- (a) two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the lifeboat or liferaft embarkation deck or decks. In general, one of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space. The shelter shall be of steel, insulated where necessary, and be provided with a self-closing steel door at the lower end; or
- (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the lifeboat or liferaft embarkation deck or decks and additionally, in the lower part of the space and in the position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the lifeboat and liferaft embarkation deck.

(4) In a ship of less than 1,000 tons the Minister may permit one of the means of escape required by paragraph (3) to be dispensed with having regard to the size and disposition of the upper part of the space.

(5) From machinery spaces other than machinery spaces of Category A, escape routes shall be provided to the satisfaction of the Minister having regard to the nature and location of the space and the number of persons normally employed in that space.

(6) Lifts shall not be considered as forming one of the required means of escape as required by this Rule.

PART 8

STRUCTURAL FIRE PROTECTION

Tankers

Tankers of Class VII(T), VIII(T), VIII(A)(T) and IX(A)(T) of 500 tons and greater

Application of Rules 137 to 151

136. Rules 137 to 151 apply to tankers of Class VII(T), VIII(T), VIII(A)(T) and IX(A)(T) of not less than 500 tons gross tonnage carrying crude oil and petroleum products having a closed flash-point not exceeding 60°C, and the Reid vapour pressure of which is below that of atmospheric pressure, or other liquids having a similar or additional fire hazard, and to gas carriers.

Structure

137. (1) The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material, except that the crowns and casings of machinery spaces of Category A and the exterior boundaries of superstructures and deckhouses that are required to be insulated to “A-60” standard in compliance with Rule 138, shall be constructed only of steel.

(2) Where any part of the structure is of aluminium alloy, the following requirements shall apply:

- (a) the insulation of aluminium alloy components of “A” or “B” class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” class division and 30 minutes duration in the case of a “B” class division;
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, shall be such that the temperature rise limitation specified in subparagraph (a) shall apply for 60 minutes duration.

Exterior boundaries of superstructures and deckhouses

- 138.(1)(a) Exterior boundaries of superstructures and deckhouses enclosing accommodation, including any overhanging decks that support such accommodation, shall be insulated to “A-60” standard for the whole of the portions that face the cargo area and on the side portions for a distance of not less than 3 m from the portions that face the cargo area.
 - (b) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998 and before 1 July 2002, exterior boundaries of superstructures and deckhouses enclosing accommodation, including any overhanging decks that support such accommodation, shall be constructed of steel and insulated to “A-60” standard for the whole of the portions that face the cargo area and on the side portions for a distance of not less than 3 m from the portions that face the cargo area.
- (2) (a) Entrances, air inlets and openings to accommodation spaces, service spaces and control stations shall not face the cargo area. They shall be located on the transverse bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 4 per cent of the length of the ship but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area, provided that such distance need not exceed 5 m.
- (b) Except as permitted in paragraph (3), in the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992 and before 1 July 1998, access doors, air

inlets and openings to accommodation spaces, service spaces, control stations and machinery spaces shall not face the cargo area. They shall be located on the transverse bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 4 per cent of the length of the ship but not less than 3 m from the end of the superstructure or deckhouse facing the cargo area, provided that such distance need not exceed 5 m.

- (3) (a) No doors shall be fitted within the limits specified in paragraph (2) except that the Minister may permit doors to a space within those limits if –
- (i) that space is a cargo control station, provisions room or store room, and
 - (ii) that space does not have access to any accommodation space, service space or control station.

Where such doors are fitted to a space located aft of the cargo area, the boundaries of the space shall be insulated to “A-60” standard, with the exception of the boundary facing the cargo area. Bolted plates for removal of machinery may be fitted within the limits specified in paragraph (2). Wheelhouse doors and wheelhouse windows may be located within the limits specified in paragraph (2) so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

- (b) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992 and before 1 July 1998, the Minister may permit access doors in boundary bulkheads facing the cargo area or within the 5 m limits specified in paragraph (2) to main cargo control stations and to such service spaces as provision rooms, store rooms and lockers, provided they do not give access directly or indirectly to any other space containing or provided for accommodation, control stations or service spaces such as galleys, pantries or workshops, or similar spaces containing sources of vapour ignition. The boundary of such a space shall be insulated to “A-60” standard, with the exception of the boundary facing the cargo area. Bolted plates for the removal of machinery may be fitted within the limits specified in paragraph (2). Wheelhouse doors and wheelhouse windows may be located within the limits specified in paragraph (2) so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

- (4) (a) Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph (2) shall be of the fixed (non-opening) type. Such windows and sidescuttles in the first tier on the main deck shall be fitted with inside covers of steel or other equivalent material.

- (b) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998 and before 1 July 2002, windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph (2) shall be of the fixed (non-opening) type and, except in the case of wheelhouse windows, shall be constructed to “A-60” class standard.

Boundary bulkheads and decks of machinery spaces of Category A and cargo pump rooms

139. (1) Windows and sidescuttles shall not be fitted in internal or external boundary bulkheads or decks of machinery spaces of Category A and cargo pump rooms, or in skylights to such spaces, except that such windows and sidescuttles may be fitted in a bulkhead between a machinery space of Category A and a machinery control room located within the boundaries of such a space.

(2) Skylights to machinery spaces of Category A and cargo pump rooms shall be capable of being closed and opened from outside the spaces which they serve.

Bulkheads within accommodation spaces, service spaces and control stations

140. (1) All bulkheads which are not required to be either “A” or “B” class divisions shall be “C” class divisions.

(2) All bulkheads required to be “B” class divisions shall extend from deck to deck and to the shell plating or other boundaries, except that where continuous “B” class ceilings or linings are fitted on both sides of the bulkheads the bulkheads may terminate at such ceilings or linings.

(3) All materials used in the construction of “B” and “C” class divisions and doors in “B” and “C” class bulkheads shall be non-combustible.

Fire integrity of bulkheads and decks

141. (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this Part, the minimum fire integrity of bulkheads and decks shall be as prescribed in Tables 1 and 2 to this Rule.

- (2) The following requirements shall govern application of Tables 1 and 2:
- (a) Tables 1 and 2 shall apply respectively to the bulkheads and decks separating adjacent spaces;
 - (b) in order to determine the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (10) below. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row in the Tables:

- (1) Control stations.
 - (2) Corridors, including lobbies.
 - (3) Accommodation spaces, excluding stairways, corridors and lobbies.
 - (4) Stairways, including:

interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto; a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.
 - (5) Service spaces of low risk, including:
 - (a) lockers and store-rooms having an area of less than 2 m², drying rooms and laundries;
 - (b) in the case of a ship of Class VII(T) or Class VIII(T) constructed on or after 1 February 1992, other than a tanker to which this Part applies, lockers and store-rooms not having provisions for the storage of flammable liquids and having an area of less than 4 m², drying rooms and laundries.
 - (6) Machinery spaces of Category A.
 - (7) Machinery spaces other than machinery spaces of Category A.
 - (8) Cargo pump rooms, including spaces containing cargo pumps and entrances and trunks to such spaces.
 - (9) Service spaces of high risk, including:
 - (a) galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 m² or greater, workshops other than those forming part of the machinery spaces;
 - (b) in the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992, galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 4 m² or greater, spaces for the storage of flammable liquids and workshops other than those forming part of the machinery spaces.
 - (10) Open decks, including open deck spaces and enclosed promenades having no fire risk; air spaces, being the space outside superstructures and deckhouses.
- (c) continuous “B” class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division;

- (d) external boundaries which are required in Rule 138 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles. Similarly, in such boundaries doors may be of materials to the satisfaction of the Minister;
- (e) permanent approved gastight lighting enclosures for illuminating cargo pump rooms may be permitted in bulkheads and decks separating cargo pump rooms and other spaces provided they are of adequate strength and the “A” class integrity and gastightness of such bulkheads and decks are not impaired;
- (f) the integrity of “A” class divisions shall be maintained at the intersections and boundaries of such divisions;
- (g) (i) where superscripts “a” to “e” inclusive occur in Tables 1 and 2 the following shall apply:
 - superscripts:
 - a Rule 142 applies;
 - b where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the rating shown in the Tables is only required when the adjacent spaces are for a different purpose. A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an “A-0” bulkhead;
 - c bulkheads separating the wheelhouse, chartroom and radio room from each other may be “B-0” standard;
 - d bulkheads and decks between cargo pump rooms and machinery spaces of Category A may be penetrated by cargo pump shaft glands and similar glanded penetrations, provided that gastight seals and efficient lubrication or other means of ensuring the permanence of the gastight seals are fitted in any of the bulkheads and decks;
 - e fire insulation is not required to be fitted if the machinery space in category (7) has little or no fire risk in the opinion of the Minister;
 - (ii) where an asterisk appears in the Tables, the division is required to be of steel or other equivalent material but is not required to be an “A” class division.

Protection of stairways and lifts in accommodation and service spaces

142. (1) Every stairway within accommodation spaces, service spaces and control stations shall be constructed of steel except where the Minister approves the use of other equivalent material. Every such stairway and lift shall lie respectively within an enclosure or trunk constructed of "A" class divisions of "A-0" standard, except that an isolated stairway serving only two decks shall only be required to be enclosed at one level by either "A" class divisions of "A-0" standard or "B" class divisions of "B-0" standard, provided that the fire integrity of any bulkhead which separates a stairway from either a machinery space of Category A or a cargo pump room shall be determined by reference to Table 1 to Rule 141.

(2) Every opening in a stairway enclosure and lift trunk shall be provided with a means of closure which shall be permanently attached thereto and which shall comply with the requirements of Rule 143 or Rule 144, whichever is applicable.

Openings in "A" class divisions

143. (1) Where an "A" class division is pierced for the passage of electric cables, pipes, trunks, girders or beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

(2) The construction of all doors and frames in "A" class bulkheads, with the means of securing the doors when closed, shall provide resistance to fire as well as to the passage of smoke and flame, as far as is reasonably practicable, equivalent to that of the bulkheads in which the doors are situated.

(3) Every door in an "A" class bulkhead shall be so constructed that it can be opened and closed by one person from either side of the division.

(4) Every door in an "A" class bulkhead which forms part of a stairway enclosure or lift trunk serving accommodation spaces, service spaces or control stations and every door in a casing of a machinery space of Category A shall be self-closing.

(5) Hold-back arrangements may be fitted to doors to which paragraph (4) refers provided that such arrangements:

- (a) have remote release fittings of a type which in the event of disruption of the control system will automatically close the doors; and
- (b) will permit each door to be closed manually.

(6) Doors fitted in boundary bulkheads of machinery spaces of Category A shall be reasonably gastight and self-closing.

(7) Watertight doors are not required to be insulated.

(8) Where ventilation ducts pass through "A" class divisions, the requirements of Rule 145 shall apply.

Openings in "B" class divisions

144. (1) Where a "B" class division is pierced for the passage of electric cables, pipes, trunks, girders or beams or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

(2) The construction of all doors and frames in "B" class bulkheads shall provide resistance to fire as well as to the passage of flame, as far as is reasonably practicable, equivalent to that of the bulkheads in which the doors are situated.

(3) The number of ventilation openings in "B" class divisions shall be kept to a minimum and shall be provided as far as is reasonably practicable only in the lower part of a door and fitted with a grille constructed of steel or under a door except that such openings shall not be provided in a door in a "B" class division forming a stairway enclosure. The net area of any such opening or openings shall not exceed 0.05 m² and in no case shall a gap under a door exceed 25 mm. The grille shall be capable of being manually closed from each side of the door.

(4) Every door in a "B" class bulkhead which forms a stairway enclosure or part thereof shall be self-closing.

(5) Hold-back arrangements may be fitted to doors to which paragraph (4) refers provided that such arrangements:

- (a) have remote release fittings of a type which in the event of disruption of the control system will automatically close the doors; and
- (b) will permit each door to be closed manually.

Ventilation systems

145. (1) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by Rule 143, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this Rule, vertical ducts shall be insulated as required by Tables 1 and 2 to Rule 141.

(2) Ducts serving stairway enclosures shall be taken from the fan room independently of other ducts in the ventilation system and shall not serve any other space.

(3) There shall be provided for every control station situated below deck, other than a control station situated in the machinery space, means to ensure ventilation, visibility and freedom from smoke within it so that in the event of a fire in the ship, the equipment it contains may be operated effectively. Unless the control station is situated on, and has access to, an open deck or is provided with local closing arrangements equally effective to maintain ventilation, visibility and freedom from smoke in the event of a fire in the ship, there shall be provided at least two entirely separate means of supplying air to such a control station, and the air inlets to these sources of supply shall be so situated that the risk of both drawing in smoke simultaneously is, as far as practicable, eliminated.

(4) Ventilation ducts, except those in cargo spaces, shall be constructed as follows:

- (a) ducts not less than 0.075 m² in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of subparagraph (c) and of paragraphs (5) and (6), ducts of less than 0.075 m² in sectional area, other than vertical ducts referred to in subparagraph (a), shall be constructed of non-combustible materials. Where such ducts penetrate "A" or "B" class divisions, the fire integrity of the division shall be maintained;
- (c) ducts not exceeding 0.02 m² in sectional area nor 2 m in length shall not be required to be non-combustible provided that the following conditions are satisfied:
 - (i) the ducts shall be constructed of suitable material having regard to the risk of fire;
 - (ii) in the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998, the ducts shall be of a material that has low flame spread characteristics;
 - (iii) the ducts are used only at the terminal ends of the ventilation system;
 - (iv) the ducts are not located closer than 0.6 m along their lengths to penetrations of "A" or "B" class divisions.

(5) Ducts provided for the ventilation of machinery spaces of Category A or galleys shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either:

- (a)
 - (i) constructed of steel having a thickness of at least 3 mm and 5 mm for ducts the widths or diameters of which are up to and including 300 mm and 760 mm and greater respectively and, in the case of such ducts, the widths or diameters of which are between 300 mm and 760 mm having a thickness to be obtained by interpolation;
 - (ii) suitably supported and stiffened;
 - (iii) fitted close to the boundaries penetrated with automatic fire dampers, which are also capable of being closed manually; and
 - (iv) insulated to "A-60" standard from the machinery space or galley to a point at least 5 m beyond each fire damper;
- or
- (b)
 - (i) constructed of steel in accordance with subparagraphs (a)(i) and (ii) and
 - (ii) insulated to "A-60" standard throughout the accommodation spaces, service spaces or control stations.

(6) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A or galleys unless either:

- (a) (i) the ducts, where they pass through a machinery space of Category A or galley, shall be constructed of steel in accordance with subparagraphs (5)(a)(i) and (ii);
- (ii) automatic fire dampers, which are also capable of being closed manually, shall be fitted close to the boundaries penetrated; and
- (iii) the integrity of the machinery space or galley boundaries shall be maintained at the penetrations;

or

- (b) (i) the ducts, where they pass through a machinery space of Category A or galley, shall be constructed of steel in accordance with subparagraphs (5)(a)(i) and (ii) and
- (ii) shall be insulated to “A-60” standard within the machinery space or galley.

(7) Exhaust ducts from galley ranges, where they pass through accommodation spaces or spaces containing combustible materials, shall be constructed of “A” class divisions. Every such exhaust duct shall be fitted with:

- (a) a grease trap readily removable for cleaning;
- (b) an automatic fail-safe fire damper located in the lower end of the duct;
- (c) arrangements, operable from within the galley, for shutting off the exhaust fan;
- (d) a fixed means of extinguishing a fire within the duct using either carbon dioxide or a water spray system.

In addition to complying with subparagraph (b) above, galley ventilation ducts shall also comply with paragraph (5).

(8) Where a ventilation duct of sectional area exceeding 0.02 m² passes through an “A” class bulkhead or deck, the opening in the bulkhead or deck shall be lined with a steel sleeve unless the duct, where it passes through the bulkhead or deck, is constructed of steel. At the penetration, the sleeve or duct shall comply with the following specifications:

- (a) the duct or sleeve shall have a thickness of at least 3 mm over a length of 900 mm and as far as possible one half of that length shall be on each side of the bulkhead or deck. The duct or sleeve shall be insulated so as to maintain the standard of fire integrity of the bulkhead or deck;
- (b) every duct shall be fitted with a fire damper which is capable of being closed manually from each side of the division unless the Minister determines otherwise. In every duct of sectional area exceeding 0.075 m², the fire damper shall also operate automatically. The manual operating position shall be readily

accessible and be marked in red light-reflecting colour. The damper shall be fitted with a visible indicator showing whether the damper is in the open or shut position. Fire dampers shall not be required, however, where ducts pass through spaces surrounded by “A” class divisions, without serving those spaces, provided that those ducts have the same fire integrity and insulation value as the divisions which they pierce. Where divisions have differing “A” class standards, the ducts shall be of the higher standard.

(9) Where a ventilation duct of sectional area exceeding 0.02 m² passes through a “B” class division, the opening shall be lined with a steel sleeve of 900 mm in length unless the duct, where it passes through the division, is constructed of steel. This length shall be divided, if possible, into 450 mm on each side of the division.

(10) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998, the following arrangements shall be tested in accordance with Part 3 of the Fire Test Procedures Code:

- (a) fire dampers, including relevant means of operation; and
- (b) duct penetrations through “A” class divisions. Where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed flanges or by welding, the test shall not be required.

Details of construction

146. All ceilings, linings, draught stops and their associated grounds in accommodation and service spaces and control stations shall be constructed of non-combustible materials.

Restriction of combustible materials

147. (1) All exposed surfaces in corridors and stairway enclosures and surfaces, including grounds, in concealed or inaccessible spaces within accommodation and service spaces and control stations shall be such that a surface spread of flame of Class 1 is not exceeded or, in the case of a ship constructed on or after 1 July 1998, they shall have low flame-spread characteristics.

- (2) (a) Primary deck coverings in accommodation and service spaces and control stations shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures.
- (b) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998, primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material that will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures, this being determined in accordance with Annex 1, Part 6 of the Fire Test Procedures Code.

- (3) (a) Paints, varnishes and other finishes used on exposed surfaces within accommodation and service spaces, control stations and machinery spaces shall not contain nitrocellulose or other highly flammable base products and shall not be capable of producing excessive quantities of smoke. Such surfaces, except where otherwise required by these Rules, shall be such that a surface spread of flame of Class 2 will not be exceeded except that this requirement shall not apply to furniture, furnishings, machinery and similar items.
- (b) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 July 1998, paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products, this being determined in accordance with Annex 1, Parts 2 and 5 of the Fire Test Procedures Code.
- (4) (a) Insulating materials shall be of non-combustible materials except in respect of:
- (i) materials used to insulate refrigerated compartments;
 - (ii) materials used to insulate valves associated with hot and cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class I will not be exceeded or, in the case of a ship constructed on or after 1 July 1998, they shall have low flame-spread characteristics;
 - (iii) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded.
- (b) (i) Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces, they may have a combustible veneer not exceeding 2 mm in thickness within any such space except corridors, stairway enclosures and control stations, where the veneer shall not exceed 1.5 mm in thickness.
- (ii) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992, where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer with a calorific value not exceeding 45 MJ/m² of the area for the thickness used, measured in accordance with ISO Standard 1716 “Building Materials – Determination of Calorific Potential”.
- (c) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992, the total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space bounded by non-combustible bulkheads, ceilings and linings shall not exceed a volume equivalent to a 2.5 mm veneer on the combined areas of the walls and ceilings.

Miscellaneous items of fire protection

148. (1) Any pipe which penetrates an “A” or “B” class division shall be of suitable material having regard to the temperature such divisions are required to withstand.

(2) In accommodation spaces, service spaces or control stations, pipes intended to convey oil or other flammable liquids shall be of a suitable material having regard to the risk of fire.

(3) Overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to danger of flooding.

(4) Electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element.

(5) Cellulose-nitrate film shall not be used in cinematograph installations.

(6) All waste receptacles shall be constructed of non-combustible materials with solid sides and bottoms.

(7) In spaces where penetration of oil products is possible, the surface of insulation materials shall be impervious to oil or oil vapours.

(8) Every air space enclosed behind a ceiling, panel or lining within accommodation spaces, service spaces and control stations shall be divided by close fitting draught stops which shall be spaced not more than 14 m apart and which shall be closed at each deck.

(9) In the case of a ship of Class VII(T) or Class VIII(T) to which this Part applies constructed on or after 1 February 1992, for the protection of cargo tanks carrying crude oil and petroleum products having a flashpoint not exceeding 60°C, materials readily rendered ineffective by heat shall not be used for valves, fittings, tank opening covers, cargo vent piping and cargo piping so as to prevent the spread of fire to the cargo.

(10) In the case of a ship constructed on or after 1 February 1992, paint lockers and flammable liquid lockers shall be protected by an appropriate fire-extinguishing arrangement approved by the Minister.

Fixed fire detection and fire alarm system

149. In every tanker to which this Part applies, a fixed fire detection and fire alarm system of an approved type complying with the requirements specified in Schedule 11 shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

Special arrangements in machinery spaces

150. The following provisions shall apply to machinery spaces:

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door. The fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Means of escape

151. (1) In every ship, stairways and ladderways shall be arranged so as to provide ready means of escape to the lifeboat and liferaft embarkation deck from all accommodation spaces, service spaces and other spaces in which the crew are normally employed. In particular, the following provisions shall be complied with:

- (a) at all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces;
- (b) below the lowest open deck such escapes shall be by means of stairways except that one of these stairways may be replaced by a trunked vertical ladder;
- (c) above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof;
- (d) one of the means of escape may be dispensed with in an exceptional case having regard to the nature and location of the space and to the number of persons who normally might be accommodated or employed there;
- (e) no dead-end corridors having a length of more than 7 m shall be permitted. A dead-end corridor is a corridor or part of a corridor from which there is only one escape route;
- (f) the width and continuity of the means of escape shall be to the satisfaction of the Minister;
- (g) if a radio office has no direct access to the open deck, two means of escape from such office shall be provided. The Minister may permit one of those escapes to be an opening type window or sidescuttle of sufficient size.

(2) In every ship, two means of escape shall be provided from each machinery space of Category A. In particular, one of the following provisions shall be complied with:

- (a) two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the lifeboat or liferaft embarkation deck or decks. In general, one of these ladders shall provide continuous fire shelter from the lower part of the space to

a safe position outside the space. The shelter shall be of steel, insulated where necessary, and shall be provided with a self-closing steel door at the lower end; or

- (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the lifeboat or liferaft embarkation deck or decks and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the lifeboat and liferaft embarkation deck.

(3) In a ship of less than 1,000 tons, the Minister may permit one of the means of escape required by paragraph (2) to be dispensed with having regard to the size and disposition of the upper part of the space.

(4) From machinery spaces other than those of Category A, escape routes shall be provided to the satisfaction of the Minister having regard to the nature and location of the space and the number of persons normally employed in that space.

(5) Lifts shall not be considered as forming one of the required means of escape as required by this Rule.

PART 9

SPECIAL REQUIREMENTS FOR SHIPS CARRYING DANGEROUS GOODS

Application and special requirements

152.(1)(a) Subject to subparagraph (b) and paragraph (2), passenger ships and other ships of not less than 500 tons gross tonnage that are intended, or which contain cargo spaces that are intended, for the carriage of dangerous goods on international voyages shall comply with the protective requirements prescribed in paragraphs (5), (6), (7), (8), (9), (10), (11) and Tables 1 to 6 to this Rule as appropriate.

- (b) The provisions of subparagraph (a) shall apply to a ship of Class VII of less than 500 tons gross tonnage constructed on or after 1 February 1992.

(2) This Rule shall not apply to a ship or a space intended for the carriage of dangerous goods in limited quantities as referred to in Chapter 3.4 of the IMDG Code.

(3) Nothing in this Rule shall be taken to require duplication of anything already provided in a ship in compliance with other requirements of these Rules.

(4) For the purpose of determining the application of the requirements of paragraph (5), ships and cargo spaces are divided into categories (A) to (E) as set out below and in Tables 1 and 2:

- (A) ships and cargo spaces not specifically designed for the carriage of freight containers but intended for the carriage of dangerous

goods in packaged 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.

(5) The applicable requirements for the purposes of this Rule are set out in the following subparagraphs (a) to (q) and the first column of the Tables to this Rule:

- (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 fire main or by suitably placed remote starting arrangements for the fire pumps;
- (b) the quantity of water delivered shall be capable of supplying 4 nozzles of a size and at pressure as specified in Rules 62 and 63, 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 Minister;
- (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 9 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 at the discretion of the Minister. 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) provisions to flood a designated under deck cargo space with suitable specified media may be substituted for the requirements in subparagraph (c);
- (e) electrical equipment and wiring where permitted for such spaces shall be to the requirements of Rule 53(6) of the Passenger Ship Construction Rules 1985 or of Rule 50 of the Cargo Ship Construction Rules 1985, whichever is appropriate;
- (f) ro-ro cargo spaces and special category spaces shall be fitted with a fixed fire detection and fire alarm system complying with the

requirements of Schedule 11. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system complying with the requirements of Schedule 11 or a sample extraction smoke detection system complying with the requirements of Schedule 12. If a sample extraction smoke detection system is fitted, particular attention shall be given to paragraph 1(k) of Schedule 12 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 6 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 mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;
- (i) in the case of a ship constructed on or after 1 July 1998 and before 1 July 2002, natural ventilation shall be provided in enclosed cargo spaces intended for the carriage of solid dangerous goods in bulk, where there is no provision for mechanical ventilation;
- (j) where flammable or toxic liquids are to be carried in enclosed cargo spaces, the bilge pumping arrangements shall be to the requirements of Rule 36(5) of the Passenger Ship Construction Rules 1985 or of Rule 8(8) of the Cargo Ship Construction Rules 1985, whichever is appropriate;
- (k) four sets of full protective clothing resistant to chemical attack shall be provided in addition to the fire-fighter's outfits required elsewhere in these Rules. Protective clothing shall cover all skin so that no part of the body is unprotected;
- (l) at least two sets of self-contained breathing apparatus shall be provided in addition to the breathing apparatus otherwise required in these Rules;
- (m) at least 3 portable fire extinguishers of the dry powder type or equivalent complying with Rule 68 shall be provided for each cargo space. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in these Rules;
- (n) 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 m 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 m horizontally away from machinery space bulkheads in all cases and the common bulkheads shall be insulated to "A-60" standard;
- (o) 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 9 for the protection of all parts of any deck and vehicle platform in such space, except that the Minister may permit the use of any other fixed fire extinguishing system that has been shown by full scale test to be no less effective;

- (p) in a ship constructed on or after 1 July 1998 and before 1 July 2002 having ro-ro cargo spaces and special category spaces, a separation shall be provided between a closed ro-ro cargo space and an adjacent open ro-ro cargo space. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. Such separation is not required to be provided if the ro-ro cargo space is considered to be a closed cargo space over its entire length and shall fully comply with the relevant special requirements of this Rule;
- (q) in a ship constructed on or after 1 July 1998 and before 1 July 2002 having ro-ro cargo spaces and special category spaces, a separation shall be provided between a closed ro-ro cargo space or special category spaces and the adjacent weather deck. The separation shall be such as to minimize the passage of dangerous vapours and liquids between such spaces. A separation is not required to be provided if the arrangements of the closed ro-ro cargo spaces and special category spaces are in accordance with those required for the dangerous goods carried on the adjacent weather deck.

(6) The classes of dangerous goods referred to in this Rule are those specified in the Merchant Shipping (Dangerous Goods) Rules 1992 (S.I. No. 391 of 1992). Such classes are listed in the first row of Tables 3, 4, 5 and 6.

(7) Ships and cargo spaces in categories (A), (B), (C) or (E) shall comply with a particular subparagraph of paragraph (5) if,

- (a) an “X” appears in Tables 1 or 2 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 Tables 5 or 6 and an “X” appears in that Table where the vertical column for that class crosses the horizontal row for that subparagraph.

(8) Ships and cargo spaces of category (D) shall comply with the requirements of a particular subparagraph of paragraph (5) if the dangerous goods (being solid dangerous goods in bulk) are of a class included in Tables 3 or 4 and an “X” appears where the vertical column for that class of goods crosses the horizontal row for that subparagraph.

(9) Any requirement applicable in accordance with this Rule 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.

(10) Where in a ship or cargo space of category (D) dangerous goods of Class 4.3 are carried, the Minister may, having regard to the specific hazards of such particular dangerous goods when transported by sea, impose such additional requirements as the Minister may consider necessary in the interest of safety.

(11) 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 in the case of a ship constructed prior to 1 July 1998

Rule 152(4) Rule 152(5)	(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 Rules to different classes of dangerous goods see Table 3	X
(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 ^d
(f) Fire detection	X	X	X	—	—		X ^d
(g) Power ventilation	X	X ^a	X	—	—		X ^d
(h) Fans	X	X ^a	X	—	—		X ^d
(j) Bilge pumping	X	X	X	—	—		—
(k) Protective clothing	X	X	X	X	X		—
(l) Breathing apparatus	X	X	X	X	X		—
(m) Fire extinguishers	X	—	—	X	X		—
(n) Insulation of boundaries	X	X ^b	X	X	X		—
(o) Water spray	—	—	X ^c	X	—		—

Notes to be applied to 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 Minister.

Table 2

Application of the requirements to different modes of carriage of dangerous goods in ships and cargo spaces in the case of a ship constructed on or after 1 July 1998 and before 1 July 2002

Wherever X appears in Table 2 it means that this requirement is applicable to all classes of dangerous goods as set out in the appropriate row of Table 6, except as indicated by the Notes.

Rule 152(4)	Weather decks (A) to (E) inclusive	(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 ⁵	Open ro-ro cargo spaces		
Rule 152(5)							
(a) Immediate availability of water supplies	X	X	X	X	X	For application of requirements of these Rules to different classes of dangerous goods see Table 4	X
(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 ⁴
(f) Fire detection	—	X	X	X	—		X ⁴
(g) Power ventilation	—	X	X ¹	X	—		X ⁴
(h) Fans	—	X	X ¹	X	—		X ⁴
(j) Bilge pumping	—	X	X	X	—		—
(k) Protective clothing	X	X	X	X	X		—
(l) Breathing apparatus	X	X	X	X	X	—	
(m) Fire extinguishers	X	X	—	—	X	—	
(n) Insulation of boundaries	X	X	X ²	X	X	—	
(o) Water spray	—	—	—	X ³	X	—	

Notes to be applied to Table 2

- ¹ For Classes 4 and 5.1, not applicable to closed freight containers. For 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.
- ² Applicable to decks only.
- ³ Applies only to closed ro-ro cargo spaces, not capable of being sealed.
- ⁴ In the special case where the barges are capable of obtaining 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 Minister.
- ⁵ Special category spaces shall be treated as closed ro-ro cargo spaces when dangerous goods are carried.

Table 3

Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk in the case of a ship constructed prior to 1 July 1998

Class of Dangerous Goods	4.1	4.2	4.3 ^f	5.1	6.1	8	9
Rule 152(5)							
(a) Immediate availability of water supplies	X	X	—	X	X ^g	X ^g	X
(b) ^e Quantity of water	X	X	—	X	—	—	X
(e) Electrical equipment	X	X ^g	X	X ^g	—	—	X ^g
(g) ^h Power ventilation	X ^g	X ^g	X	X ^g	—	—	X ^g
(h) ^h Fans	X	X ^g	X	X ^g	—	—	X ^g
(k) & (l) Personnel protection	X	X	X	X	X	X	X
(n) Insulation of boundaries	X	X	X	X ^g	X ^g	X ^g	X

Notes to be applied to Table 3

- ^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 Rule 152(10).
- ^g Further requirements which may be applicable in a particular case are contained in the IMDG Code or the IMSBC Code.
- ^h In cases where power ventilation is required in the IMSBC Code, the use of portable ventilation units or equipment to the satisfaction of the Minister may suffice.

Table 4

Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk in the case of a ship constructed on or after 1 July 1998 and before 1 July 2002

Class of Dangerous Goods	4.1	4.2	4.3 ⁶	5.1	6.1	8	9
Rule 152(5)							
(a) Immediate availability of water supplies	X	X	—	X	—	—	X
(b) Quantity of water	X	X	—	X	—	—	X
(e) Electrical equipment	X	X ⁷	X	X ⁸	—	—	X ⁸
(g) Power ventilation	—	X ⁷	X	—	—	—	—
(h) Fans	X ⁹	X ⁷	X	X ^{7,9}	—	—	X ^{7,9}
(i) Natural ventilation	X	X	X	X	X	X	X
(k) & (l) Personnel protection	X	X	X	X	X	X	X
(n) Insulation of boundaries	X	X	X	X ⁷	—	—	X ¹⁰

Notes to be applied to Table 4

- ⁶ The hazards of substances in this class which may be carried in bulk are such that special consideration shall be given by the Minister to the construction and equipment of the ship involved in addition to meeting the requirements enumerated in Table 4.
- ⁷ Only applicable to Seedcake containing solvent extractions, to Ammonium nitrate and to Ammonium nitrate fertilizers.
- ⁸ Only applicable to Ammonium nitrate and to Ammonium nitrate fertilizers. However, a degree of protection in accordance with standards contained in the International Electrotechnical Commission, publication 79 - Electrical Apparatus for Explosive Gas Atmospheres, is sufficient.
- ⁹ Only suitable wire mesh guards are required.
- ¹⁰ The requirements of the IMSBC Code are sufficient.

Table 5

Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk in the case of a ship constructed prior to 1 July 1998

Class of Dangerous Goods	1	2	3	4	5.1	5.2	6.1	8
Rule 152(5)								
(a) Immediate availability of water supplies	X	X	X	X ^o	X	X ^o	X	X
(b) Quantity of water	X	X	X	X ^o	X	X ^o	—	—
(c) Water cooling	X ^k	—	—	—	—	—	—	—
(d) Cargo space flooding	X ^k	—	—	—	—	—	—	—
(e) Electrical equipment	X ^k	X ^l	X ^m	—	—	—	X ^{m/o}	X ^{m/o}
(f) Fire detection	X	X	X	X	X	—	X	X
(g) Power ventilation	—	X ^j	X ^m	X ^o	X ^o	—	X ^{m/o}	X ^{m/o}
(h) Fans	—	X ^l	X ^m	—	—	—	X ^{m/o}	X ^{m/o}
(j) Bilge pumping	—	—	X ^m	—	—	—	X ⁿ	X ^m
(k) & (l) Personnel protection	—	X	X	X	X	X ^o	X	X
(m) Fire extinguishers	—	—	X	X	X	X ^o	X ^o	X ^o
(n) Insulation of boundaries	X ^{k, p}	X	X	X	X ^o	—	X ^o	X ^o
(o) Water spray	X	X	X ^m	X ^o	X	—	X ^m	X ^m

Notes to be applied to Table 5

- ⁱ This requirement is applicable only when the characteristics of the substances 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 to liquids only.
- ^o Further requirements which may be applicable are contained in the IMDG Code or the IMSBC Code, as appropriate.
- ^p Goods of class 1 shall be stowed 3 m horizontally away from the machinery space boundaries in all cases.

Table 6

Application of the requirements to different classes of dangerous goods except solid dangerous goods in bulk in the case of a ship constructed on or after 1 July 1998 and before 1 July 2002

Class of Dangerous Goods	1.1 to 1.6	1.4S	2.1	2.2	2.3	3.1 3.2	3.3	4.1	4.2	4.3	5.1	5.2	6.1 liquids	6.1 liquids ≤23°C	6.1 liquids >23°C ≤61°C	6.1 solids	8 liquids	8 liquids ≤23°C	8 liquids >23°C ≤61°C	8 solids	9
Rule 152(5)																					
(a) Immediate availability of water supplies	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
(b) Quantity of water	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	—
(c) Water cooling	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(d) Cargo space flooding	X	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(e) Electrical equipment	X	—	X	—	—	X	—	—	—	—	—	—	—	X	—	—	—	X	—	—	—
(f) Fire detection	X	X	X	X	X	X	X	X	X	X	X	—	X	X	X	X	X	X	X	X	—
(g) Power ventilation	—	—	X	—	X	X	—	X ¹¹	X ¹¹	X	X ¹¹	—	—	X	X	X ¹¹	—	X	X	—	X ¹¹
(h) Fans	—	—	X	—	—	X	—	—	—	—	—	—	—	X	X	—	—	X	X	—	—
(j) Bilge pumping	—	—	—	—	—	X	—	—	—	—	—	—	X	X	X	—	—	X	—	—	—
(k) & (l) Personnel protection	—	—	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ¹⁴
(m) Fire extinguishers	—	—	—	—	—	X	X	X	X	X	X	—	—	X	X	—	—	X	X	—	—
(n) Insulation of boundaries	X ¹²	—	X	X	X	X	X	X	X	X	X ¹³	—	—	X	X	—	—	X	X	—	—
(o) Water spray	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes to be applied to Table 6

- ¹¹ When “mechanically-ventilated spaces” are required by the IMDG Code.
- ¹² Stow 3 m horizontally away from the machinery space boundaries in all cases.
- ¹³ Refer to the IMDG Code.
- ¹⁴ As appropriate to the goods being carried.

PART 10
MISCELLANEOUS

Alternative construction and equivalents

153. Where these Rules require that a ship shall be constructed in a particular manner or that a particular fitting, material, appliance or apparatus or type thereof shall be fitted or carried in a ship, or that any particular provision shall be made, the Minister may approve the ship to be constructed in any other manner or may approve any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that ship, if the Minister is satisfied by trial thereof or otherwise that such other construction, fitting, material, appliance or apparatus, or type thereof, or provision is at least as effective as that required by these Rules.

Exemptions

154. The Minister may grant exemptions from all or any of the provisions of these Rules (as may be specified in the exemption) for classes of cases or individual cases on such terms (if any) as the Minister may so specify and may, subject to giving reasonable notice, alter or cancel any such exemption.

Revocations

155. The following are revoked:

- (a) the Merchant Shipping (Fire Protection) Rules 1985 (S.I. No. 279 of 1985);
- (b) the Merchant Shipping (Fire Protection) (Amendment) Rules 1990 (S.I. No. 86 of 1990).

SCHEDULE 1

Rules 15 and 41

INTERNATIONAL SHORE CONNECTION

1. The international shore connection required by these Rules to be carried in a ship shall comply with the following specifications:

Details of flange

Outside diameter: 178 millimetres

Inner diameter: 64 millimetres

Bolt circle diameter: 132 millimetres

Holes: 4 holes of 19 millimetres in diameter equidistantly placed, slotted to the flange periphery

Flange thickness: 14.5 millimetres minimum

Bolts: 4 each of 16 millimetres diameter; 50 millimetres in length with 8 washers

Flange surface: flat face

Material: any suited to 10 bar (1.0 N/mm²) service

Gasket: any suited to 10 bar (1.0 N/mm²) service.

2. The connection shall be constructed of steel or other suitable material for 10 bar (1.0 N/mm²). The flange shall have a flat face on one side and to the other there shall be permanently attached a coupling which will fit the ship's hydrants and hose. The connection shall be kept aboard the ship together with its gasket, bolts and washers.

SCHEDULE 2

Rule 68(1)

NON-PORTABLE FOAM FIRE EXTINGUISHERS

1. Every foam fire extinguisher, other than a portable fire extinguisher provided in compliance with these Rules, shall be constructed of suitable materials and shall be of an efficient design and of sufficient strength to withstand with an adequate factor of safety the maximum internal pressure to which it may be subjected and shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure. For the purpose of this Schedule, the maximum working pressure shall be the equilibrium pressure that develops within the body at 70°C when the correctly charged extinguisher has been operated with all outlets closed.

2. Where the extinguisher is provided with a gas cylinder as the means for expelling the extinguishing medium, such gas cylinder shall be constructed in accordance with ISO 9809-1:2019 and ISO 9809-3:2019.

3. The extinguisher shall be provided with a nozzle and a reinforced discharge hose constructed to withstand four times the maximum working pressure specified in paragraph 1.

4. Where the extinguisher is provided with an inner container such container shall be adequately supported.

5. Any necessary openings in the extinguisher body shall be fitted with caps or covers so designed that any pressure remaining in the container may be released gradually before the cap or cover can be removed completely.

6. Every part of the extinguisher shall, where necessary, be protected against corrosion.

7. The extinguisher shall be provided with a controllable device to enable the discharge to be interrupted and a means to prevent the loss of liquid when the extinguisher is standing.

8. The extinguisher actuating mechanism shall be protected so that it is safeguarded against inadvertent operation.

9. The design shall permit the ready availability of the extinguisher to be verified as required and ensure that it will be apparent whether or not the extinguisher has been operated.

10. A fully charged extinguisher shall, when operated under normal conditions, be capable of projecting foam a distance of 14 m for a period of not less than 90 seconds in the case of an extinguisher of 135 litres capacity and greater, and a distance of 10 m for a period of not less than 60 seconds in the case of an extinguisher of 45 litres or greater but less than 135 litres capacity.

11. The outside of the extinguisher body shall be clearly marked in accordance with the Regulations of 2017.

12. The extinguisher shall have the correct filling level clearly indicated.

SCHEDULE 3

Rule 68(1)

NON-PORTABLE CARBON DIOXIDE FIRE EXTINGUISHERS

1. Every carbon dioxide fire extinguisher, other than a portable fire extinguisher, provided in compliance with these Rules shall be provided with cylinders that comply with the Regulations of 2017.

2. Each cylinder shall be provided with an internal discharge tube and a valve to release the gas.

3. The extinguisher shall be provided with a discharge hose which shall be reinforced so as to withstand a pressure of at least 122 bar when the necessary couplings are fitted. The bore of the discharge hose shall not be less than the size respectively set out in Table A:

TABLE A

Capacity of Extinguisher	Minimum bore of discharge hose
16 kilogrammes	10 millimetres
45 kilogrammes	12 millimetres

The discharge hose shall be provided with a horn which shall be of electrically non-conducting material and of a design which will reduce the velocity of the gas discharged. The metal part of the operating handle shall be suitably sheathed to protect the hands of the operator from extreme cold.

4. At any temperature between 15°C and 18°C, the extinguisher shall discharge gas at such a rate that carbon dioxide equal in weight to 75 per cent of the capacity of the container will be discharged in the periods respectively set out in Table B:

TABLE B

Capacity of extinguisher	Period
16 kilogrammes	30 to 45 seconds
45 kilogrammes	60 to 90 seconds

5. The outside of the extinguisher shall be clearly marked in accordance with the Regulations of 2017.

SCHEDULE 4

Rule 68(1)

NON-PORTABLE DRY POWDER FIRE EXTINGUISHERS

1. Every dry powder fire extinguisher, other than a portable fire extinguisher, provided in compliance with these Rules shall be constructed of suitable materials and shall be of an efficient design and of sufficient strength to withstand with an adequate factor of safety the maximum internal pressure to which it may be subjected and shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure. For the purpose of this Schedule, the maximum working pressure shall be the equilibrium pressure that develops within the body at 70°C when the correctly charged extinguisher has been operated with all outlets closed.
2. Where the extinguisher is provided with a gas cylinder as the means for expelling the extinguishing medium, such gas cylinder shall be constructed in accordance with ISO 9809-1:2019 and ISO 9809-3:2019.
3. The extinguisher shall be provided with a nozzle and a reinforced discharge hose constructed to withstand four times the maximum working pressure specified in paragraph 1.
4. Any necessary openings in the extinguisher body shall be fitted with caps or covers so designed that any pressure remaining in the container may be released gradually before the cap or cover can be removed completely.
5. Every part of the extinguisher shall, where necessary, be protected against corrosion.
6. The extinguisher shall be effectively sealed to prevent the ingress of moisture, but such sealing arrangements shall not interfere with the discharge of the extinguisher.
7. The extinguisher shall be provided with a controllable device to enable the discharge to be interrupted.
8. The extinguisher actuating mechanism shall be protected so that it is safeguarded against inadvertent operation.
9. The design shall permit the ready availability of the extinguisher to be verified as required and ensure that it will be apparent whether or not the extinguisher has been operated.
10. A fully charged extinguisher shall, when operated under normal conditions, be capable of discharging not less than 85 per cent of the mass of the dry powder charge. The discharge rate shall be not less than 1 kilogramme per second.
11. The outside of the extinguisher body shall be clearly marked in accordance with the Regulations of 2017.

SCHEDULE 5

14(1)(b), 40(2), 54, Rule 70(1)

BREATHING APPARATUS

Smoke helmet and smoke mask type breathing apparatus

1. Every smoke helmet or smoke mask provided in compliance with these Rules shall be provided with a hose for the supply of air from the outside atmosphere. An air pump or bellows shall be provided which shall be suitable for pumping air through the hose. The hose shall be of the non-collapsing type and shall be sufficient in length to enable the air pump or bellows to be on the open deck in clean air well clear of any hatch or doorway while the wearer of the helmet or mask is in any part of the accommodation, service, cargo or machinery spaces. Efficient couplings shall be provided if two or more lengths of hose are to be joined in order to reach the aforesaid spaces. The air inlet to the pump or bellows shall be so protected as to ensure that the supply of air cannot be obstructed.

Self-contained breathing apparatus

2. (a) Every self-contained breathing apparatus provided in compliance with these Rules shall be of the open circuit compressed air type.
- (b) Provision may be made to enable an alternative means of air supply to be connected to the apparatus.
- (c) Every self-contained breathing apparatus shall be provided with not more than one face mask unless the apparatus has been certified for use with a second face mask which may be used in extreme emergency.
- (d) (i) The storage capacity of the compressed air cylinder or cylinders attached to the apparatus and carried by the wearer shall be at least 1,200 litres of fresh air. The storage cylinders shall be constructed of suitable material and shall be of efficient design and of sufficient strength to withstand with an adequate factor of safety, the internal air pressure to which they may be subjected and each cylinder shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure.
- (ii) In the case of a passenger ship of Class I or Class II carrying more than 36 passengers, at least two spare charges for each breathing apparatus shall be provided, and all air cylinders for breathing apparatus shall be interchangeable.
- (e) Means shall be provided for the automatic regulation of the air supply to the wearer of the apparatus in accordance with his or her breathing requirements when he or she is breathing any volume of free air of up to 85 litres per minute at any time when the pressure in the supply cylinder or cylinders is above 10.5 bar

(10.5 kilogrammes per square centimetre). Means shall be provided for overriding the automatic air supply to increase the volume of air available to the wearer if required.

- (f) A pressure gauge with an anti-bursting orifice shall be incorporated in the high pressure air supply system to enable the wearer to read directly and easily the pressure of air in the supply cylinder or cylinders.
- (g) The maximum weight of any such apparatus shall not exceed 16 kilogrammes, excluding any lifeline and, if they do not form an integral part of the apparatus, any safety belt or harness.
- (h) Every self-contained breathing apparatus shall be provided with fully charged spare cylinders having a spare storage capacity of at least 2,400 litres of free air except that:
 - (i) if the ship is carrying 5 sets or more of such apparatus, the total spare storage capacity of free air shall not be required to exceed 9,600 litres;

or

 - (ii) if the ship is equipped with means for re-charging the air cylinders to full pressure with air, free from contamination, the spare storage capacity of the fully charged spare cylinders of each such apparatus shall be of at least 1,200 litres of free air, and the total spare storage capacity of free air provided in the ship shall not be required to exceed 4,800 litres.
- (i) A servicing and instruction manual shall be kept with each self-contained breathing apparatus.

General

3. (a) Every breathing apparatus shall be constructed of materials having adequate mechanical strength, durability and resistance to deterioration by heat or by contact with water and such materials shall be resistant to fire and shall not allow the breathing circuit to be penetrated by smoke or chemical fumes likely to be encountered in service. The fabric used in the construction of any harness provided with such apparatus shall be resistant to shrinkage. Exposed metal parts of the apparatus harness and fittings shall be of materials so far as practicable resistant to frictional sparking.
- (b) The following equipment shall be provided for use with each set of breathing apparatus:
 - (i) a fire-proof life-and-signalling-line at least 3 m longer than is required to reach from the open deck in clean air well clear of any hatch or doorway to any part of the accommodation, service, cargo, or machinery spaces. The line shall be made of copper or galvanised steel wire rope having a breaking strength of at least 500 kilogrammes and

shall be overlaid up to at least 32 mm in circumference by hemp or other covering to provide a surface which can be firmly gripped when wet;

- (ii) an adjustable safety belt or harness to which such line shall be capable of being securely attached and detached by the wearer by means of a snaphook;
 - (iii) means for protecting the eyes and face of the wearer against smoke;
 - (iv) plates of suitable non-flammable material bearing a clearly legible code of signals to be used between the wearer and his or her attendant, one of which shall be attached to the safety belt or harness and another attached to the free end of the lifeline.
- (c) Every breathing apparatus shall be clearly marked with the manufacturer's name and other details and shall be accompanied by instructions, information and any other required documentation in compliance with the Regulations of 2017.

SCHEDULE 6

Rules 7(4)(b), 10(2)(b), 10(3)(b), 33(2)(b), 36(2)(b), 36(3)(b)

PORTABLE FOAM APPLICATOR UNITS

1. Every portable foam applicator unit provided in compliance with these Rules shall be provided with:
 - (a) an induction type of air foam nozzle capable of being connected to the fire main by means of a fire hose;
 - (b) a portable tank containing at least 20 litres of foam concentrate from which the nozzle specified at paragraph (a) can induce the contents;
 - (c) a spare tank identical to that specified at paragraph (b).
2. The nozzle, whilst being supplied at the minimum hydrant pressure on the ship permitted by these Rules, shall be capable of producing effective foam suitable for extinguishing an oil fire at the rate of at least 1.5 m³ per minute.
3. The ratio of the volume of foam produced to the volume of foam solution shall not exceed 12 to 1.

SCHEDULE 7

Rules 86(2)(b), 87(3)(d), (e) and (g), 89(7), 90(4), 93(2)(a), 95, 96(6), 103(2)(b), 104(3)(d) and (e), 106(7), 107(5), 110(2)(a), 112 and 133(2)

AUTOMATIC SPRINKLER, FIRE DETECTION AND FIRE ALARM SYSTEMS

1. (a) Every automatic sprinkler, fire detection and fire alarm system shall be capable of immediate operation at all times and no action by the crew shall be necessary to set it in operation. It shall be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of the Minister this is a necessary precaution. Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing. The system shall be kept charged at the necessary pressure and shall have provision for a continuous supply of water as required in this Schedule.
- (b) (i) Each section of sprinklers shall include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. Such alarm systems shall be such as to indicate if any fault occurs in the system. In the case of a ship of Class I or Class II and a ship of 500 tons and greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 July 1998, such units shall indicate in which section served by the system fire has occurred and shall be centralised on the navigation bridge and, in addition, visible and audible alarms from the unit shall be located in a position other than on the navigation bridge, so as to ensure that the indication of fire is immediately received by the crew.
- (ii) In passenger ships, such units shall give an indication of any fire and its location in any space served by the system and shall be centralised on the navigating bridge or in the main fire control station, which shall be so manned or equipped as to ensure that any alarm from the system is immediately received by a responsible member of the crew.
- (iii) In cargo ships, such units shall indicate in which section served by the system fire has occurred and shall be centralised on the navigating bridge and in addition, visible and audible alarms from the unit shall be placed in a position other than on the navigating bridge, so as to ensure that the indication of fire is immediately received by the crew.
- (iv) In the case of a ship of Class I or Class II and a ship of 500 tons and greater of Class VII, Class VIII, Class VII(T) or

Class VIII(T) constructed on or after 1 July 1998, the provisions of subparagraphs (ii) and (iii) shall not apply.

2. (a) Sprinklers shall be grouped into separate sections, each of which shall contain not more than 200 sprinklers. In passenger ships, any section of sprinklers shall not serve more than two decks and shall not be situated in more than one main vertical zone. The Minister may permit such a section of sprinklers to serve more than two decks or be situated in more than one main vertical zone, if the Minister is satisfied that the protection of the ship against fire will not thereby be reduced.
 - (b) Each section of sprinklers shall be capable of being isolated by one stop valve only. The stop valve in each section shall be readily accessible and its location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the stop valves by any unauthorised person.
 - (c) A gauge indicating the pressure in the system shall be provided at each section stop valve and at a central station.
 - (d) The sprinklers shall be resistant to corrosion by marine atmosphere. In accommodation and service spaces, the sprinklers shall come into operation within the temperature range from 68°C to 79°C, except that in locations such as drying rooms, where high ambient temperatures might be expected, the operating temperature may be increased by not more than 30°C above the maximum deckhead temperature.
 - (e) A list or plan shall be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.
 - (f) Sprinklers shall be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 litres per m² per minute over the nominal area covered by the sprinklers. Alternative distribution arrangements or sprinklers providing other amounts of water may be permitted providing the arrangements are no less effective.
 - (g) Sprinklers shall be spaced not more than 4 m apart and not more than 2 m from a bulkhead. They shall be placed as clear as possible of beams or other objects likely to obstruct the projections of water and in such positions that combustible material in the space concerned will be well sprayed.
 - (h) At least 6 spare sprinklers shall be provided for each section.
3. (a) A pressure tank having a volume equal to at least twice that of the charge of water specified in this subparagraph shall be provided. The tank shall contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in paragraph 4 and the arrangements shall provide for maintaining an air pressure in the tank such as to

ensure that where the standing charge of fresh water in the tank has been used the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system. Suitable means of replenishing the air under pressure and of replenishing a fresh water charge in the tank shall be provided.

- (b) The pressure tank shall be fitted with an efficient relief valve and with a water level gauge glass and a pressure gauge. Stop valves or cocks shall be provided at each of the gauge connections. Means shall be provided to prevent the inadvertent admission of sea water into the tank.
4. (a) An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.
- (b) The pump and the piping system shall be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 280 m² at the application rate specified in paragraph 2(f).
 - (c) The pump shall have a test valve with a short open ended discharge pipe fitted on the delivery side. The effective area through the valve and pipe shall be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in paragraph 3(a).
 - (d) The pump shall have a suction direct from the sea which shall be independent of any other suction and which shall be in the space containing the pump. The sea inlet to the pump shall be so arranged that when the ship is afloat it will not be necessary to shut off the supply of sea water to the pump for any purpose other than the inspection or repair of the pump.
5. The sprinkler pump and tank shall be situated in a position reasonably remote from any machinery space of Category A and shall not be situated in any space required to be protected by the sprinkler system.
6. No part of the control, storage or generating arrangement of any fixed fire extinguishing system shall be situated forward of the collision bulkhead in any passenger ship.
7. (a) Not less than two sources of power supply for the sprinkler pump, air compressor and automatic alarm and detection system shall be provided in a passenger ship. Where the sources of power are electrical, one shall be an emergency source. One supply for the pump shall be taken from the main switchboard and one from the emergency switchboard by separate feeders reserved solely for that purpose. The feeders shall be arranged so as to avoid galleys,

machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards, and shall be run to an automatic changeover switch situated near the sprinkler pump. This switch shall permit the supply of power from the main switchboard so long as a supply is available therefrom and be so designed that upon failure of that supply it will automatically change over to the supply from the emergency switchboard. The switches on the main and emergency switchboards shall be clearly labelled and normally kept closed. No other switch shall be permitted in the feeders concerned. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion type engine it shall, in addition to complying with the provisions of paragraph 5, be so situated that a fire in any protected space will not affect the air supply to the machinery.

- (b) In a cargo ship there shall not be less than two sources of power supply for the sea water pump and automatic alarm and detection system. If the pump is electrically driven it shall be connected to the main source of electrical power, which shall be capable of being supplied by at least two generators. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph 5, be so situated that a fire in any protected space will not affect the air supply to the machinery.

8. Every sprinkler system shall have a connection from the ship's fire main provided with a screw down valve and non-return valve at the connection which will prevent a back flow from the sprinkler system to the fire main. In addition, there may be fitted hosed couplings with shut off valves and non-return valves situated close to the couplings for the purpose of coupling to a shore supply, but no other external connection shall be fitted. The sprinkler system shall be a self-contained unit. Shut off valves for the shore supply and the ship's fire mains connections shall be clearly and permanently marked to show their purpose and shall be capable of being locked in the closed position.

- 9. (a) A test valve shall be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section shall be situated near the stop valve for that section.
- (b) Means shall be provided for testing the automatic operation of the pump on reduction of pressure in the system.
- (c) Switches shall be provided at one of the indicating positions referred to in paragraph 1(b)(i) which will enable the alarm and the indicators for each section of sprinklers to be tested.

SCHEDULE 8

Rules 10(1)(a), 11(c), 36(1)(a), 37(c)

FIXED PRESSURE WATER SPRAYING SYSTEMS FOR MACHINERY SPACES AND
CARGO PUMP ROOMS

1. Every fixed pressure water spraying system fitted in compliance with these Rules shall be provided with a pump, piping system, control valves and spraying nozzles. The pump provided for machinery space protection shall not be used for any other purpose except that the Minister may permit the pump to be used for supplying cargo pump room or cargo space water spraying systems where such systems are permitted. For cargo pump room protection, the water supply may be from the ship's main fire pumps provided such pumps comply with the requirements of this Schedule.

2. The spraying nozzles shall be of such a type, sufficient in number and so arranged as to ensure an effective average distribution of water in accordance with Table A:

TABLE A

Protected area	Application rate	
	litres per m ² /min.	gallons per sq. ft./min.
Boiler fronts or roof firing areas, oil fuel units, centrifugal separators (not oily water separators), oil fuel purifiers and clarifiers.	20	0.4
Hot oil fuel pipes near exhaust pipes or similar heated surfaces on main or auxiliary diesel engines.	10	0.2
Tank top areas and oil tanks not forming part of the ship's structure.	5	0.1
Cargo pump rooms.	10	0.2

3. Spraying nozzles shall be fitted above bilges, tank tops and other areas over which oil fuel is liable to spread and above other main fire hazards in the spaces to be protected.

4. The water spraying system may be divided into sections and shall be controlled from distribution manifolds the valves of which shall be capable of being operated from easily accessible positions outside the spaces to be protected and which will not be readily cut off by an outbreak of fire within the protected space.

5. The water spraying system shall be kept charged at the necessary pressure and the pump supplying the water from the system shall be automatically put into action by a pressure drop in the system.

6. The pump may be driven by independent internal combustion type machinery but if it is dependent upon power being supplied from the emergency generator fitted in compliance with the Passenger Ship Construction Rules 1985 or the Cargo Ship Construction Rules 1985, the generator shall be arranged to start automatically in case of main power failure so that power for the pump is immediately available. When the pump is driven by independent internal combustion type machinery it shall be so situated that a fire in the protected space will not affect the air supply to the machinery and the pump compartment.

7. The pump shall be capable of supplying water at the necessary pressure simultaneously to all sections of the water spraying system in any one compartment to be protected. The pump and its controls shall be installed outside the space or spaces to be protected. It shall not be possible for a fire in the space or spaces protected by the water spraying system to put the system out of action.

8. Means shall be provided which will prevent nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pumps.

9. No part of the water spraying system in any passenger ship shall be situated forward of the collision bulkhead.

10. Operating instruction in clear and permanent lettering shall be affixed to every water spraying system or in a position adjacent thereto.

SCHEDULE 9

Rules 8(2), (3) and (4), 34(1)(b), 34(4) and (5), 96(1)(c), 97(b), 113(1)(c), 114(b), 152(5)(c) and (o)

FIXED PRESSURE WATER SPRAYING SYSTEMS FOR CARGO SPACES

1. Every fixed pressure water spraying system fitted in compliance with these Rules shall be provided with a pump, piping system, control valves and spraying nozzles.

2. The nozzles shall be of an accepted full bore type and shall be arranged so as to secure an effective distribution of water in the spaces that are to be protected.

3. The system shall be such as will provide water application at a rate of at least 3.5 litres per m² per minute for spaces with a deck height not greater than 2.5 m and at least 5 litres per m² per minute for spaces with a deck height greater than 2.5 m.

4. Precautions shall be taken to prevent the nozzles from becoming clogged by impurities in the water.

5. The system shall cover the full breadth of the protected space except that, in ships where the protected space is subdivided with longitudinal Class "A" divisions, the breadth of the sections may be reduced accordingly. In ships of Class I, II, VII or VIII and in ships of Class II(A) or VIII(A) of 76 m or greater in length or where the length of the enclosed part of the protected space is 50 m or greater, the system may be divided into sections provided they are at least 20 m in length. In ships of other classes, the length of a section may be less than 20 m but shall not be less than 10 m provided the capacity of the pumps are capable of supplying the two largest adjacent sections simultaneously at the application rate referred to in paragraph 3.

6. The distribution valves for the system shall be situated in an easily accessible position adjacent to, but outside, the space to be protected which will not readily be cut off by a fire within the space. Direct access to the distribution valves from the protected spaces and from outside the spaces shall be provided. Adequate ventilation shall be fitted in the space containing the distribution valves.

7. The water supply to the system shall be provided by a pump or pumps, other than the ship's required fire pumps, which shall additionally be connected to the system by a lockable non-return valve which will prevent a back flow from the system into the fire main.

8. The principal pump or pumps shall be capable of supplying simultaneously, at all times, at the required pressure, all nozzles in the protected spaces, or two adjacent sections if this is less, a quantity of water in accordance with paragraphs 2 and 3.

9. The principal pump or pumps shall be capable of being brought into operation by remote control, which may be manually actuated, from the position at which the distribution valves are situated.

10. In ships of Class I or II, and in the ships of Class II(A) of 76 m or greater in length or where the length of the enclosed part of the protected space is 50 m or greater, the principal pump or pumps shall be situated in a position reasonably remote from the protected space and from any machinery space of Category A. In ships of other classes, the principal pump or pumps shall be situated outside the protected space but may be situated within any machinery space.

11. In ships of Class I or II, and in ships of Class II(A) of 76 m or greater in length or where the length of the enclosed part of the protected space is 50 m or greater, if the principal pump or pumps are electrically driven there shall be two sources of power, one of which shall be the emergency generator. In ships of other classes, there shall be two sources of power which may be two of the auxiliary generators provided they are independently driven. If the principal pump or pumps are driven by independent internal combustion type machinery, they shall be so situated that a fire in the protected space will not affect the air supply to the machinery and the pump compartment.

12. When a fixed pressure water spraying system is provided for the machinery spaces in accordance with Schedule 8, the pump required for that system may also be used for the purpose of complying with this Schedule.

13. The sea suction of the pump shall be so arranged that, when the ship is afloat, it will not be necessary to shut off the supply of sea water to the pump for any purpose other than the inspection or repair of the pump.

14. The pump suction and discharge valves and any other valves requiring to be operated to bring the pump into operation shall be locked open or be operable from any control position of the system. A pressure gauge shall be provided at such control positions to show when water is available.

15. A waste valve with a short open ended pipe shall be fitted between the pump discharge and section control valves for testing purposes.

16. The pipes of the system shall be solid drawn or welded steel or equivalent and shall be hydraulically tested by the manufacturers to twice the working pressure but not less than 20 bar (2N/mm²) and be galvanised internally to prevent corrosion.

17. Fittings such as self-aligning swivel joints and flexible pipes situated within the protected space shall not be readily rendered ineffective by heat and where such fittings are used at least one spare of each type fitted shall be carried.

SCHEDULE 10

Rules 8(1) and (3), 10(1)(b), 11(c), 34(1)(a), (2)(a), (3)(b) and (4), 36(1)(b), 37(c), 52(1)(a), 97(b), 114(b)

FIXED GAS FIRE EXTINGUISHING SYSTEMS

General

1. (a) Fire extinguishing systems provided for use in any ship to which these Rules apply shall not contain an extinguishing medium which either itself or under expected conditions of use gives off toxic gases in such quantities as to endanger personnel.
- (b) (i) In every system provided for the injection of fire extinguishing medium into any compartment for fire extinguishing purposes, the pipes for conveying the medium shall be provided with control valves or cocks which shall be so placed that they will be easily accessible and not readily cut off from use by an outbreak of fire within the protected compartment. Such control valves or cocks shall be permanently marked to indicate clearly the compartments to which the pipes are led.
- (ii) Where cargo spaces fitted with a gas extinguishing system for fire protection are used as passenger spaces the extinguishing connection shall be blanked during service as a passenger space.
- (c) The piping for the distribution of fire extinguishing medium shall be arranged and discharge nozzles so positioned that a uniform distribution of medium is obtained.
- (d) Means shall be provided to close all openings which may admit air to allow gas to escape from a protected space.
- (e) Where the volume of free air contained in air receivers in any space is such that, if released in such space in the event of fire, such release of air within that space would seriously affect the efficiency of the fixed fire extinguishing system, an additional quantity of fire extinguishing medium shall be provided.
- (f) Means shall be provided for automatically giving audible warning of the release of fire extinguishing medium into any space in which personnel normally work or to which they have access. The alarm shall operate for a suitable period before the medium is released.
- (g) The means of control of any fixed gas fire extinguishing system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location

there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.

- (h) Automatic release of fire extinguishing medium shall not be permitted.
- (i) Where the quantity of extinguishing medium is required to protect more than one space, the quantity of medium available is not required to be more than the largest quantity required for any one space so protected.
- (j) Pressure containers required for the storage of fire extinguishing medium shall be located outside protected spaces in accordance with paragraph 1(l).
- (k) The storage containers and associated pressure components shall be constructed of suitable material and shall be of efficient design and sufficient strength having regard to their locations and maximum ambient temperatures expected in service.
- (l) When the fire extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible position and shall be effectively ventilated to the satisfaction of the Minister. Any entrance to such a storage room shall be from the open deck and in any case shall be independent of the protected space. Access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjoining enclosed spaces shall be gastight. For the purpose of the application of the integrity Tables referred to in Rules 87, 104, 125 and 141, such storage rooms shall be treated as control stations.
- (m) Spare parts for the system shall be stored on board and be to the satisfaction of the Minister.
- (n) No part of the control, storage or generating arrangement of any fixed fire extinguishing system in any passenger ship shall be situated forward of the collision bulkhead.
- (o) The list of solid bulk cargoes for which a fixed gas fire-extinguishing system is ineffective and for which a fire-extinguishing system giving equivalent protection is required shall be determined having regard to IMO Circular MSO.1/Circ.1395 in its updated version.

Carbon dioxide systems

- 2. (a) When carbon dioxide is used as the extinguishing medium in cargo spaces, the quantity of gas available shall be sufficient to give a minimum volume of free gas equal to 30 per cent of the gross volume of the largest cargo compartment in the ship which is capable of being sealed.
- (b) When carbon dioxide is used as the extinguishing medium in cargo spaces containing motor vehicles with fuel in their tanks for

their own propulsion or in closed ro-ro spaces or closed ro-ro spaces used for bulk stowage of cargo, the quantity of gas available shall be sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being effectively sealed.

- (c) When carbon dioxide is used as an extinguishing medium for machinery spaces or pump rooms, the quantity of gas available shall be sufficient to give a minimum of free gas equal to the larger of the following quantities, either –
- (i) 40 per cent of the gross volume of the largest space, such volume being measured up to the level at which the horizontal area of the casing is 40 per cent or less of the gross area of such space measured midway between the tank top and the lowest part of the casing, or
 - (ii) 35 per cent of the gross volume of the largest space including the casing,

provided that the aforesaid percentages may be reduced to 35 per cent and 30 per cent respectively for ships of less than 2,000 tons, not being passenger ships, provided also that if two or more machinery spaces are not entirely separate they shall be considered as forming one space.

- (d) The volume of carbon dioxide shall be calculated at 0.56 m³/kg.
- (e) (i) When carbon dioxide is used as the extinguishing medium for machinery spaces or pump rooms, the arrangements shall be such that 85 per cent of the gas required to provide the concentration referred to in paragraph 2(c) when applied to the space concerned can be discharged into that space within 2 minutes.
- (ii) When carbon dioxide is used as the extinguishing medium in cargo spaces containing motor vehicles with fuel in their tanks for their own propulsion, or in closed ro-ro spaces, the arrangements shall be such as to ensure that at least two thirds of the gas required for the space can be introduced within 10 minutes.
- (f) In the case of a ship of Class I or Class II and a ship of Class VII, Class VIII, Class VII(T) or Class VIII(T) of 500 tons and greater, carbon dioxide systems installed on or after 1 October 1994 shall comply with the following requirements:
- (i) two separate controls shall be provided for releasing carbon dioxide into a protected space and to ensure the activities of the alarm. One control shall be used to discharge the gas from its storage containers. A second control shall be used for opening the valve of the piping which conveys the gas into the protected space;
 - (ii) the two controls shall be located inside a release box clearly identified for the particular space. If the box containing the

controls is to be locked, a key to the box shall be in a break-glass type enclosure conspicuously located adjacent to the box.

- (g) Safe means shall be provided for the crew to check the quantity of medium within the containers.

SCHEDULE 11

Rules 13(1)(a) and (b), (2), (3) and (8), 39, 95(1) and (3), 97(a), 99(3), 112(1) and (3), 114(a), 133, 149, 152(5)(f)

FIXED FIRE DETECTION AND FIRE ALARM SYSTEMS

General requirements

1. (a) Any required fixed fire detection and fire alarm system with manually operated call points shall be capable of immediate operation at all times.
- (b) Power supplies and electric circuits necessary for the operation of the system shall be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition shall initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.
- (c) There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire detection and fire alarm system, one of which shall be an emergency source. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall run to an automatic changeover switch situated on or adjacent to the control panel for the fire detection system.
- (d) Detectors and manually operated call points shall be grouped into sections. The activation of any detector or manually operated call point shall initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within 2 minutes an audible alarm shall be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of Category A. This alarm sounder system is not required to be an integral part of the detection system.
- (e) The control panel shall be located on the navigating bridge or in the main fire control station.
- (f) (i) Indicating units shall denote the section in which a detector or manually operated call point has operated. At least one unit shall be so located that it is easily accessible to responsible members of the crew at all times when at sea or in port except when the ship is out of service. One indicating unit shall be located on the navigating bridge if the control panel is located in the main fire control station.
- (ii) In the case of a ship of Class I or Class II and a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 October 1994, subparagraph (i) shall be a minimum requirement.

- (g) Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.
- (h)
 - (i) No section covering more than one deck within accommodation spaces, service spaces and control stations shall be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of fire, each section shall contain not more than 100 detectors and shall cover not more than 50 enclosed spaces.
 - (ii) In the case of a ship of Class I or Class II and a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 October 1994, subparagraph (i) shall apply where the fire detection system does not include means of remotely identifying each detector individually. If the detection system is fitted with remotely and individually identifiable fire detectors, the sections may cover several decks and serve any number of enclosed spaces.
- (i)
 - (i) In a passenger ship, a section of detectors shall not serve spaces on both sides of the ship nor on more than one deck and neither shall it be situated in more than one main vertical zone except that the Minister, if he or she is satisfied that the protection of the ship against fire will not thereby be reduced, may permit such a section of detectors to serve both sides of the ship and more than one deck.
 - (ii) In the case of a ship of Class I or Class II and a ship of 500 tons or greater of Class VII, Class VIII, Class VII(T) or Class VIII(T) constructed on or after 1 October 1994, subparagraph (i) shall apply if there is no fire detection system capable of remotely and individually identifying each detector. In a passenger ship of Class I or Class II fitted with individually identifiable fire detectors, a section may serve spaces on both sides of the ship and on several decks but may not be situated in more than one vertical zone.
- (j) A section of fire detectors covering a control station, service space, accommodation space or cargo space shall not include a machinery space of Category A.
- (k) Detectors shall be operated by heat, smoke or other products of combustion, flame or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be accepted by the Minister provided that they are no less sensitive than such detectors. Flame detectors shall be used only as additional to smoke or heat detectors.
- (l) Suitable instructions and spare components for testing and maintenance shall be provided.

- (m) The function of the detection system shall be periodically tested to the satisfaction of the Minister by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond. All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.
- (n) The fire detection system shall not be used for any other purpose except that closing of fire doors and similar functions may be permitted at the control panel.
- (o) No part of the control, storage or generating arrangement of any fixed fire extinguishing system in a passenger ship shall be situated forward of the collision bulkhead.
- (p) A fire detection system with a zone address identification capability fitted on or after 1 October 1994 shall be so arranged that:
 - (i) a loop cannot be damaged at more than one point by a fire;
 - (ii) means are provided to ensure that any fault, such as a power break, short circuit, earth, occurring in the loop will not render the whole loop ineffective;
 - (iii) all arrangements are made to enable the initial configuration of the system to be restored in the event of failure, such as electrical, electronic, informatic failure;
 - (iv) the first initiated fire alarm will not prevent any other detector to initiate further fire alarms.

Installation requirements

- 2. (a) Manually operated call points shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.
- (b) Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces. Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.
- (c) Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph 2(b), at least one detector complying with paragraph 1(k) shall be installed in each such space.
- (d) Detectors shall be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions

where impact or physical damage is likely shall be avoided. In general, detectors which are located in overhead positions shall be a minimum distance of 0.5 m away from bulkheads.

- (e) The maximum spacing of detectors shall be in accordance with Table A below:

TABLE A

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m ²	9 m	4.5 m
Smoke	74 m ²	11 m	5.5 m

The Minister may require or permit other spacings based upon test data which demonstrate the characteristics of the detectors.

- (f) Electrical wiring that forms part of the system shall be so arranged as to avoid galleys, machinery spaces of Category A, and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarm in such spaces or to connect to the appropriate power supply.

Design requirements

3. (a) The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships.
- (b) Smoke detectors required by paragraph 2(b) shall be certified to operate before the smoke density exceeds 12.5 per cent obscuration per metre, but not to operate until the smoke density exceeds 2 per cent obscuration per metre. Smoke detectors to be installed in other spaces shall operate within sensitivity limits to the satisfaction of the Minister having regard to the avoidance of detector insensitivity or over-sensitivity.
- (c) Heat detectors shall be certified to operate before the temperature exceeds 78°C but not to operate until the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector shall operate within temperature limits to the satisfaction of the Minister having regard to the avoidance of detector insensitivity or oversensitivity.
- (d) The permissible temperature of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

Special requirements for periodically unattended machinery spaces

4. For periodically unattended machinery spaces, the fixed fire detection and fire alarm system shall comply with the following additional requirements:

- (a) the fire detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigating bridge and by a responsible engineer officer. When the navigating bridge is unmanned, the alarm shall sound in a place where a responsible member of the crew is on duty;
- (b) after installation, the system shall be tested under varying conditions of engine operation and ventilation.

Special requirements for cargo spaces

5. In cargo spaces, the system shall comply with the following additional requirements:

- (a) detectors shall be grouped into separate sections such that a section shall cover not more than one cargo space. Each section shall contain not more than 100 detectors;
- (b) the type, number and spacing of detectors shall be to the satisfaction of the Minister taking into account the conditions of ventilation and other factors prevailing in the space in which the detectors are installed;
- (c) in special category spaces and ro-ro cargo spaces, the system shall be capable of rapidly detecting the onset of fire. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Minister.

SCHEDULE 12

Rules 13(2) and (9), 39(3), 97(a), 114(a), 152(5)(f)

SAMPLE EXTRACTION SMOKE DETECTION SYSTEMS

General requirements

1. (a) In this Schedule, “system” means “sample extraction smoke detection system”.
- (b) Any required system shall be capable of continuous operation at all times except that systems operating on a sequential scanning principle may be accepted, provided that the interval between scanning the same position twice gives an overall response time to the satisfaction of the Minister.
- (c) Power supplies necessary for the operation of the system shall be monitored for loss of power. Occurrence of loss of power shall initiate a visual and audible signal at the control panel and the navigating bridge which shall be distinct from a signal indicating smoke detection.
- (d) An alternative power supply for the electrical equipment used in the operation of the system shall be provided.
- (e) The control panel shall be located on the navigating bridge or in the main fire control station.
- (f) The detection of smoke or other products of combustion shall initiate a visual and audible signal at the control panel and the navigating bridge.
- (g) Clear information shall be displayed on or adjacent to the control panel designating the spaces covered.
- (h) The sampling pipe arrangements shall be such that the location of the fire can be readily identified.
- (i) Suitable instructions and spare components shall be provided for the testing and maintenance of the system.
- (j) The functioning of the system shall be periodically tested to the satisfaction of the Minister. The system shall be of a type that can be tested for correct operation and restored to normal surveillance without the renewal of any component.
- (k) The system shall be designed, constructed and installed so as to prevent the leakage of any toxic or flammable substances or fire-extinguishing medium into any accommodation space, service space, control station or machinery space.
- (l) No part of the control, storage or generating arrangement of any fixed fire extinguishing system in any passenger ship shall be situated forward of the collision bulkhead.

Installation requirements

2. (a) At least one smoke accumulator shall be located in every enclosed space for which smoke detection is required. However, where a space is designed to carry oil or refrigerated cargo alternatively with cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments for the system. Such means shall be to the satisfaction of the Minister.
- (b) Smoke accumulators shall be located for optimum performance and shall be spaced so that no part of the overhead deck area is more than 12 m measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators shall be considered having regard to the effects of ventilation.
- (c) Smoke accumulators shall be positioned where impact or physical damage is unlikely to occur.
- (d) Not more than 4 accumulators shall be connected to each sampling point.
- (e) Smoke accumulators from more than one enclosed space shall not be connected to the same sampling point.
- (f) Sampling pipes shall be self-draining and suitably protected from impact or damage from cargo working.

Design requirements

3. (a) The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships, and to avoid the possibility of ignition of flammable gas air mixtures.
- (b) The sensing unit shall be certified to operate before the smoke density within the sensing chamber exceeds 6.65 per cent obscuration per metre.
- (c) Duplicate sample extraction fans shall be provided. The fans shall be of sufficient capacity to operate with the normal conditions of ventilation in the protected areas and shall give an overall response time to the satisfaction of the Minister.
- (d) The control panel shall permit observation of smoke in the individual sampling pipe.
- (e) Means shall be provided to monitor the airflow through the sampling pipes and shall be so designed as to ensure that as far as practicable equal quantities are extracted from each interconnected accumulator.
- (f) Sampling pipes shall be a minimum of 12 mm internal diameter except when used in conjunction with fixed gas fire-extinguishing systems when the minimum size of pipe should be sufficient to

permit the fire-extinguishing gas to be discharged within the appropriate time.

- (g) Sampling pipes shall be provided with an arrangement for periodically purging with compressed air.

SCHEDULE 13

Rule 50(1)

FIXED DECK FOAM SYSTEM

1. The arrangements for providing foam shall be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank, the deck of which has been ruptured.

2. The deck foam system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside the cargo area adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.

3. The rate of supply of foam solution (that is, the mixture of foam concentrate and water before expansion) shall be not less than the following, whichever is the greatest:

- (a) 0.6 litre per minute per m² of cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship multiplied by the total longitudinal extent of the cargo tank spaces;
- (b) 6 litres per minute per m² of the horizontal sectional area of the single tank having the largest such area; or
- (c) 3 litres per minute per m² of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 litres per minute.

4. Sufficient foam concentrate shall be supplied to ensure at least 20 minutes of foam generation in ships fitted with an inert gas system complying with Schedule 14 or 30 minutes of foam generation in ships not fitted with an inert gas system when using the solution rates stipulated in paragraph 3. The foam expansion ratio (that is, the ratio of the volume of foam produced to the volume of the mixture of foam concentrate and water before expansion) shall not generally exceed 12 to 1.

5. Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. At least 50 per cent of the foam solution rate required in subparagraphs (a) and (b) of paragraph 3 shall be delivered from each monitor. On tankers of less than 4,000 tonnes deadweight, applicators may be substituted for an installation of monitors. In such a case the capacity of each applicator shall be at least 25 per cent of the foam solution rate required in subparagraph (a) or (b) of paragraph 3.

6. (a) The number and position of monitors shall be such as to comply with paragraph 1. The capacity of any monitor shall be at least 3 litres per minute of foam solution per m² of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity shall be not less than 1,250 litres per minute.

- (b) The distance from the monitor to the farthest extremity of the protected area forward of that monitor shall not be more than 75 per cent of the monitor throw in still air conditions.

7. A monitor and hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck. On tankers of a deadweight of less than 4,000 tonnes not fitted with monitors, a hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck.

8. The capacity of any applicator shall be not less than 400 litres per minute and the applicator throw in still air conditions shall be not less than 15 m. The number of foam applicators provided in accordance with the requirements of paragraph 5 shall be not less than 4. The number and disposition of foam main outlets shall be such that foam from at least 2 applicators can be directed on to any part of the cargo tank deck area.

9. Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

10. Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

SCHEDULE 14

Rules 50(2) and (6)(a), 51(2) and (4)

INERT GAS SYSTEMS

1. Every inert gas system provided in accordance with these Rules shall be designed, constructed and tested to the satisfaction of the Minister.
2. The system shall be capable of:
 - (a) inerting empty cargo tanks including slop tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;
 - (b) maintaining the atmosphere in any part of any cargo tank or slop tank at an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times both in port and at sea except when it is necessary for such a tank to be gas free;
 - (c) eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas free;
 - (d) purging empty cargo tanks including slop tanks of hydrocarbon gas, so that subsequent gas freeing operations will at no time create a flammable atmosphere within the tank.
3.
 - (a) The system shall be capable of delivering inert gas to the cargo tanks and slop tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship, expressed as a volume.
 - (b) The system shall be capable of delivering inert gas with an oxygen content of not more than 5 per cent by volume in the inert gas supply main to the cargo tanks and slop tanks at any required rate of flow.
4. The inert gas supply may be treated flue gas from the main or auxiliary boilers, from one or more separate gas generators or other sources or from any combination thereof. The Minister may approve systems using inert gases other than flue gas, provided the Minister is satisfied that an equivalent standard of safety is achieved. Systems using stored carbon dioxide shall not be permitted unless the Minister is satisfied that the risk of ignition from generation of static electricity by the system itself is minimised.
5. Flue gas isolating valves shall be fitted in the inert gas supply mains between the boiler uptakes and the flue gas scrubber. These valves shall be provided with indicators to show whether they are open or shut, and precautions shall be taken to maintain them gastight and keep the seating clear of soot. Arrangements shall be made so that boiler soot blowers cannot be operated when the corresponding flue gas valve is open.
6.
 - (a) A flue gas scrubber shall be fitted which will effectively cool the volume of gas specified in paragraph 3 and remove solids and

sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.

- (b) Filters or equivalent devices shall be fitted to minimise the amount of water carried over to the inert gas blowers.
 - (c) The scrubber shall be located aft of all cargo tanks, slop tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of Category A.
7. (a) At least 2 blowers shall be fitted, which together shall be capable of delivering to the cargo tanks and slop tanks at least the volume of gas required by paragraph 3. In a system provided with a gas generator, the Minister may permit only one blower if that system is capable of delivering the total volume of gas required by paragraph 3 to the protected cargo tanks, provided that sufficient spares for the blower and its prime mover are carried on board to enable any failure of the blower and its prime mover to be rectified by the ship's crew.
- (b) Two fuel oil pumps shall be fitted to the inert gas generator. The Minister may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.
 - (c) The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. Suitable shut-off arrangements shall be provided on the suction and discharge connections of each blower. Arrangements shall be provided to enable the functioning of the inert gas plant to be stabilised before commencing cargo discharge. If the blowers are to be used for gas freeing, their air inlets shall be provided with blanking arrangements.
 - (d) The blowers shall be located aft of all cargo tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of Category A.
8. (a) The design and location of scrubber and blowers with relevant piping and fittings shall be such as to prevent flue gas leakages into enclosed spaces.
- (b) To permit safe maintenance, an additional water seal or other effective means of preventing flue gas leakage shall be fitted between the flue gas isolating valves and scrubber or incorporated in the gas entry to the scrubber.
9. (a) A gas regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required in paragraphs 19(d) and 19(e). It shall also be capable of

automatically regulating the flow of inert gas to the cargo tanks unless means are provided to automatically control the speed of the inert gas blowers required in paragraph 7.

- (b) The valve referred to in subparagraph (a) shall be located at the forward bulkhead of the most forward gas safe space through which the inert gas supply main passes.
10. (a) At least 2 non-return devices, one of which shall be a water seal, shall be fitted in the inert gas supply main, in order to prevent the return of hydrocarbon vapour to the machinery space uptakes or to any gas safe spaces under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph 9 and the aftermost connection to any cargo tank or cargo pipeline.
- (b) The devices referred to in this paragraph shall be located in the cargo area on deck.
 - (c) The water seal referred to in subparagraph (a) shall be capable of being supplied by 2 separate pumps, each of which shall be capable of maintaining an adequate supply at all times.
 - (d) The arrangement of the seal and its associated provisions shall be such that it will prevent back-flow of hydrocarbon vapours and will ensure the proper functioning of the seal under operating conditions.
 - (e) Provision shall be made to ensure that the water seal is protected against freezing in such a way that the integrity of the seal is not impaired by overheating.
 - (f) A water loop or other arrangement approved by the Minister shall also be fitted to each associated water supply and drain pipe and each venting or pressure-sensing pipe leading to gas-safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.
 - (g) The deck water seal and all loop arrangements shall be capable of preventing return of hydrocarbon vapours at a pressure equal to the test pressure of the cargo tanks.
 - (h) The second non-return device mentioned in subparagraph (a) shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted forward of the deck water seal required by subparagraph (a). It shall be provided with either positive means of closure or an additional valve having such means of closure located forward of the non-return valve to isolate the deck water seal from the inert gas main to the cargo tanks and slop tanks.
 - (i) As an additional safeguard against the possible leakage of hydrocarbon liquids or vapours back from the deck main, means shall be provided to permit the section of the line between the valve having positive means of closure referred to in

subparagraph (h), and the valve referred to in paragraph 9, to be vented in a safe manner when the first of these valves is closed.

11. (a) The inert gas main may be divided into 2 or more branches forward of the non-return devices required by paragraph 10.
- (b) (i) The inert gas supply main shall be fitted with branch piping leading to each cargo tank and slop tank. Branch piping for inert gas shall be fitted with either stop valves or equivalent means of control for isolating each tank. Where stop valves are fitted, they shall be provided with locking arrangements, which shall be under the control of a responsible ship's officer. In the case of a ship of 500 tons or greater of Class VII(T) or VIII(T) constructed on or after 1 July 1998, the control system operated shall provide positive indication of the operational status of such valves.
- (ii) In combination carriers, the arrangements to isolate the slop tanks containing oil or oil residues from other tanks shall consist of blank flanges which will remain in position at all times when cargoes other than oil are being carried except as provided for in the relevant section of the Guidelines for Inert Gas Systems.
- (c) Means shall be provided to protect cargo tanks and slop tanks against the effect of over-pressure or vacuum caused by thermal variations when such tanks are isolated from the inert gas main.
- (d) Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.
- (e) Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.

12. The arrangements for the venting of all vapours displaced from the cargo tanks during loading or ballasting shall comply with Rule 12 of the Cargo Ship Construction Rules 1985 and shall consist of either one or more mast risers, or a number of high velocity vents. The inert gas supply main may be used for such venting.

13. The arrangements for inerting, purging or gas freeing of empty tanks as required in paragraph 2 shall be approved by the Minister and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimised and that:

- (a) on individual cargo tanks or slop tanks, the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with Rule 12 of the Cargo Ship Construction Rules 1985. The inlet of such outlet pipes may be located at either deck level or at not more than 1 m above the bottom of the tank;
- (b) the cross-sectional area of such a gas outlet pipe referred to in subparagraph (a) shall be such that an exit velocity of at least 20 m/s can be maintained when any 3 tanks are being simultaneously

supplied with inert gas. Their outlets shall extend not less than 2 m above deck level;

- (c) each gas outlet referred to in subparagraph (b) shall be fitted with suitable blanking arrangements;
- (d) (i) if a connection is fitted between the inert gas supply main and the cargo piping system, arrangements shall be made to ensure an effective isolation having regard to the high pressure difference which may exist between the systems. This shall consist of 2 shut-off valves with an arrangement to vent the space between the valves in a safe manner or an arrangement consisting of a spool-piece with associated blanks;
- (ii) the valve separating the inert gas supply main from the cargo main and which is on the cargo main side shall be a non-return valve with a positive means of closure.

- 14. (a) One or more pressure-vacuum breaking devices shall be provided to prevent the cargo tanks from being subject to:
 - (i) a positive pressure in excess of the test pressure of the cargo tank if the cargo were to be loaded at the maximum rated capacity and all other outlets were left shut: and
 - (ii) a negative pressure in excess of 700 mm water gauge if cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blower were to fail. Such devices shall be installed on the inert gas main unless they are installed in the venting system required by Rule 12 of the Cargo Ship Construction Rules 1985 or on individual cargo tanks.
- (b) The location and design of the devices referred to in subparagraph (a) shall be in accordance with Rule 12 of the Cargo Ship Construction Rules 1985.

15. Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the gas blowers, whenever those gas blowers are operating.

- 16. (a) Instrumentation shall be fitted for continuously indicating and permanently recording when the inert gas is being supplied:
 - (i) the pressure of the inert gas supply main forward of the non-return devices required by subparagraph 10(a);
 - (ii) the oxygen content of the inert gas in the inert gas supply main on the discharge side of the gas blowers.
- (b) The devices referred to in subparagraph (a) shall be placed in the cargo control room where provided. Where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.
- (c) In addition, meters shall be fitted:

- (i) in the navigating bridge, to indicate at all times the pressure referred to in subparagraph (a)(i) and the pressure in the slop tanks of combination carriers, whenever those tanks are isolated from the inert gas supply main; and
- (ii) in the machinery control room or in the machinery space, to indicate the oxygen content referred to in subparagraph (a)(ii).

17. Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank and slop tank such that the condition of the tank atmosphere can be determined using these portable instruments.

18. Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments referred to in paragraphs 16 and 17.

19. (a) Audible and visual alarms shall be provided to indicate:
- (i) low water pressure or low water flow rate to the flue gas scrubber referred to in paragraph 6(a);
 - (ii) high water level in the flue gas scrubber referred to in paragraph 6(a);
 - (iii) high gas temperature as referred to in paragraph 15;
 - (iv) failure of any of the inert gas blowers referred to in paragraph 7(a);
 - (v) oxygen content in excess of 8 per cent by volume referred to in paragraph 2(b);
 - (vi) failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices referred to in paragraph 9 and paragraph 16(a) respectively;
 - (vii) low water level in the water seal referred to in paragraph 10(a);
 - (viii) gas pressure less than 100 mm water gauge as referred to in paragraph 16(a)(i). The alarm arrangement for this gas pressure shall be such as to ensure that the pressure in slop tanks in combination carriers can be monitored at all times;
 - (ix) high gas pressure referred to in paragraph 16(a)(i).
- (b) The provisions of subparagraph (a) and (c) shall apply to inert gas systems of both the flue gas type and the inert gas generator type in a ship of 500 tons or greater of Class VII(T) or VIII(T) constructed on or after 1 February 1992.
- (c) In the system with gas generators, audible and visual alarms shall be provided in accordance with subparagraphs (a)(i), (a)(iii) and (a)(v) to (a)(ix) and additional alarms to indicate:
- (i) insufficient fuel oil supply;
 - (ii) failure of the power supply to the generator;

- (iii) failure of the power supply to the automatic control system for the generator.
- (d) Automatic shut down of the inert gas blowers and gas regulating valve shall be arranged on predetermined limits being reached in respect of subparagraphs (a)(i), (a)(ii) and (a)(iii).
- (e) Automatic shut down of the gas regulating valve shall be arranged so as to take account of failure of the inert gas blowers referred to in paragraph 7.
- (f) In relation to subparagraph (a)(v), when the oxygen content of the inert gas exceeds 8 per cent, immediate action shall be taken to reduce the oxygen level. Unless the quality of the gas improves, all in-tank operations shall be suspended so as to avoid air being drawn into the tanks and the insulation valve referred to in subparagraph 10(h) shall be closed.
- (g) The alarms required in subparagraphs (a)(v), (a)(vi) and (a)(viii) shall be fitted in the machinery space and cargo control room, where provided, but in any event in such a position that they are immediately received by responsible members of the crew.
- (h) In relation to subparagraph (a)(vii), the Minister shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.
- (i) An audible alarm system, independent of that required in subparagraph (a)(viii), or automatic shut down of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas main being reached.

20. A detailed instruction manual shall be provided on board by the owner and it shall cover the operational, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manual shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system as detailed in the Guidelines for Inert Gas Systems.

SCHEDULE 15

Rule 4(2)

AREAS OF SMOOTH WATERS AND PARTIALLY SMOOTH WATERS

Table

(1) Place	(2) Areas of Smooth Waters	(3) Areas of Partially Smooth Waters
Carlingford Lough	Within a line from Greencastle Point to Greenore	In Summer: Inside of a line joining Cranfeld Point and Ballagan Point In Winter: In favourable weather only, within a line drawn from Greenore and Greencastle points to a boundary line drawn from Soldiers Point at 245° to charted ruins at Ballytrasna
Dundalk	Westward of Longitude 006°21'W within Castletown Estuary	In Summer and in favourable weather only, within a line joining Cooley Point and Dunany Point
Drogheda	Within a line from Crook Point to Burrow Point	In Summer: In favourable weather only, within a radius of 2.6 nautical miles from the eastern tip of the north breakwater and terminating at the northern and southern foreshores respectively In Winter: No partially smooth waters
Skerries	No smooth waters	To St. Patrick's Island in fine weather and daylight only
Rogerstown Inlet	West of Longitude 006°06.5'W	No partially smooth waters
Malahide Inlet	West of Longitude 006°08'W	No partially smooth waters
Howth Sound	No smooth waters	Within a line from the North end of Eastern Breakwater to Thulla and south of a line joining Westwood to Steer Rock
Dublin	Inside the Pier Heads	In Summer:

		<p>Within a line from Dalkey Island to Bailey Point</p> <p>In Winter: (a) for tenders to ocean liners only; within a line from Dalkey Island to Bailey Point, in fine weather. (b) for all other ships; no partially smooth waters</p>
Dun Laoghaire	Inside Pier Heads	As Dublin
Wicklow	Inside the Pier Heads	In Summer and in favourable weather only, within 2 nautical miles of the pier heads
Arklow	Inside the Pier Heads	In Summer and in favourable weather only, within 2 nautical miles of the pier heads
Wexford	Inside Wexford Bridge	Within a line from Raven Point to Rosslare Point
Saltee Islands	No smooth waters	<p>In Summer: In favourable weather only; licenced passenger boats operating as tenders and with an approved tender safety plan and no more than 50m from the designated landing point specified in the tender safety plan</p> <p>In Winter: No partially smooth waters</p>
Bannow Estuary	Bannow Bay. Within a line drawn East to West at the entrance to Bannow Bay at 052°12.9' N	<p>In Summer: In favourable weather only within a line between Ingard Point and Clammers Point</p>
Waterford	Within a line from Passage to Ballyhack	<p>In Summer: Within a line from Dunmore to Hook Point</p> <p>In Winter: Within a line from Geneva Barrack to Duncannon Light</p>
Dungarvan	West of Cunnigar Point	<p>In Summer: Inside a line joining Ballynacourty Point Lighthouse to the western most point of the mainland of Helvick Head</p> <p>In Winter: No partially smooth waters</p>
Youghal	Within a line from Ferry Point to Green Park	No partially smooth waters

Cork	Within a line from Ram's Head to Dognose Quay	Within a radius of 3 miles from Roche's Point, in favourable weather
Oysterhaven	North of Ferry Point	In Summer: North of Kinure Point In Winter: No partially smooth waters
Kinsale Harbour	Within a line from Blockhouse Point and Summer Cove	Within a line from Moneypoint and Carrignarone
Courtmacsherry	West of 008°41.5' W	In Summer: North of a line joining wood Point and Coolmain Point In Winter: No partially smooth waters
Glandore	North of Long Point	In Summer: North of a line joining Sheila Point and Goats Head In Winter: No partially smooth waters
Castle Haven	East of Reen Point	In Summer: North of Reen Point In Winter: No partially smooth waters
Crookhaven	West of longitude 009°42'	No partially smooth waters
Baltimore	In Baltimore Harbour and inside lines drawn between the following points; from Beacon Point to Barrack Point, from Long Point to Deelish Rock and from Deelish Rock to Frolic Point	No partially smooth waters
Schull	North of a line joining Skull Point and Coosheen Pt.	Gun Point to the West end of Long Island, North of Long Island and inside a line joining Copper Pt. to Coosheen Pt.
Dunbeacon Harbour, Dunmanus Bay	No smooth waters	Within a line joining Rossmore Point and Dunbeacon Point, in favourable weather only
Bantry Bay	From Bantry or Glengariff: Within a line joining Four Heads Point East and inside Whiddy Island From Castletownbere: Inside Bere Island	Castletownbere to within a line from Lonehort Point to White Horse Point, in favourable weather and in daylight only
Kenmare (including Ardgroom and	North of 51°50.0'N	In Summer and in favourable weather and daylight only: East of Longitude 9°54.7'W.

Kilmakilloge Harbours)		In Winter: inside a line joining Dog's Pt. and Laughaun Point and North of Rossmorebullig Pt.
Blasket Islands and Dunquin	No smooth waters	Great Blasket Island – within a 500 metre radius of the pier. Dunquin Harbour – within a 500 metre radius of the pier
Valentia	Between lines joining Knightstown and Renards Point and Portmagee Swing Bridge	In favourable weather only, within a line joining Ringcaheragh Point and Scughaport Reef and within a line joining Fort Point to Beginish Island and inside Doulus Bar
Ventry Harbour	No smooth waters	In Summer and in favourable weather only, within a line joining Parkmore Point and Paddock Point
Smerwick Harbour	No smooth waters	In Summer: Inside of a line joining Carrigbreen to Dunacapple Island In winter time: No partially smooth waters
Brandon Bay	No smooth waters	In Summer: Inside of lines joining Brandon Point to Illaunboe to Rough Point
Tralee Bay	In Summer and in favourable weather and daylight only: Inside a line joining Fenit Breakwater Light to Derrymore Point	In Tralee Bay south of a line running east through Rough Point
Castlemaine Harbour	No smooth waters	East of a line joining Rossbehy Point to Inch Point
Dingle Harbour	Within a line joining Flaherty Point and Black Point	No partially smooth waters
The Shannon	East of Rinalan Point	East of a straight line joining Carrig Island, Scatterry Island Lighthouse and the Clare Coast
Doolin Point	No smooth waters	No partially smooth waters
Kilronan	No smooth waters	In Summer: Within 0.6' from Kilronan Pier In Winter: No partially smooth waters
Galway	Lough Corrib	(a) for ships when serving as tenders to ocean liners only; within a line from Black Head to Carrahouna Point

		(b) for all other ships: within a line from Black Rock Beacon to Kilcolgan Point
Cashla Bay, Greatmans Bay Kilkieran Bay	Area of smooth waters, <u>in favourable weather only</u> , is considered to be to all waters inside Cashla Bay north of Tonacrick Point, all waters inside of Greatmans Bay north of Rin Point and all waters inside of Kilkieran Bay (and Casheen Bay) east of Kilkieran Point.	No partially smooth waters
Roundstone Bay	No smooth waters	In Summer time: North of an east west line through Inishnee Pt. In winter time: No partially smooth waters
Cleggan /Inishbofin	Within a line from Cleggan Point to Roeillaun	Within the area bounded by lines joining Cleggan Point to Lyon Point and Roeillaun to Shark Head and inside Bofin Harbour, in favourable weather and daylight only
Clifden Bay	No smooth waters	In favourable weather and daylight only, within a line due North from Fishing Point
Ballynakill Harbour	Inside Ross Point	In Summer, favourable weather and daylight only, inside Freaghillaun Island
Killary Harbour	Inside Inishbarna Islands	Within a line from Tonakeera Point to Culfin Point, in favourable weather and daylight only
Clew Bay	Area of Smooth Waters, <u>in favourable weather only</u> , is considered to be to all waters to the east of a line joining Curraghmore Point to Inishgort Light House to Rosturk Castle	No partially smooth waters
Westport	Within a line from Murrisk Pier to Inishgort Light.	No partially smooth waters.
Achill Sound	North of Darby's Point to 54°00'N (In way of Bull's Mouth)	No partially smooth waters
Blacksod Bay	Inside Dooniver Point	In favourable weather only, within a line from Blacksod Point to Kinfinalta Point
Broadhaven Bay	Within a line from Shanaghy Point to Fox Point	In favourable weather only, from Gubacashel to Brandy Point

Sruwaddacon Bay	No smooth waters	East of 009° 50' West
Clare Island		Within a line from Roonagh Head to Clare Island East Harbour and Achillbeg Island to Clare Island
Killala Bay	Inside Rinnaun Point	Within 3 miles from Ross Point in favourable weather and daylight only
Sligo Harbour	Inside Metal Man Rocks. On Lough Gill.	Within a line from Raghly Point to Black Rock Point
Ballyshannon	Inside the Bar	Within a line from Aughrus Point to Kildone Point in favourable weather and daylight only
Donegal	Inside the Bar	Within a line from Doorin Point to Kildone Point in favourable weather and daylight only
Killybegs	No smooth waters	Inside a line joining Rotton Island to Port Roshin
Teelin		Within a distance of 3 miles from Dundawoona Point in favourable weather and daylight only
Burtonport	No smooth waters	Within an area bounded by lines from Ranagh Point to Wyon Point and Rinnagey to Rough Island
Sheephaven Bay	No smooth waters	In Summer: South of 55°12'N In Winter: No partially smooth waters
Mulroy Bay	Within a line from Dundooan Point and Inbeverbeg Bay	In favourable weather only, within a line from Melmore Head and Ballyhoorisky Point
Lough Swilly	Within a line from Bunrana to Muckarnish Point.	Within a line from Dunree Head to Portsalon
Lough Foyle	Inside a line joining Greencastle and Magilligan Point	No partially smooth waters

The outer limits of the smooth water areas specified in the second column of the above Table shall be taken to be the corresponding inner limits of the partially smooth water areas specified in the third column of the Table.

Unless otherwise indicated, these limits apply at all times of the year.

For the purpose of the Table:

“favourable weather” means –

- (a) weather when the visibility is good and when the combined effects of wind, sea and swell on a vessel are never greater than those which would cause moderate rolling or pitching or result in the shipping of green seas on the weather deck,
- (b) weather conditions that, where relevant, are such that passengers are not unduly wetted by spray or unduly discomforted by the motion of the vessel;

“summer” means the months of April to October inclusive;

“winter” means the months of November to March inclusive.

GIVEN under my hand,
20 July 2023

JACK CHAMBERS,
Minister of State at the Department of Transport.

EXPLANATORY NOTE

(This note is not part of the Instrument and does not purport to be a legal interpretation.)

These Rules replace and update Fire Protection Rules for the purpose of giving effect to the provisions of Chapter II-2 of the annex to the International Convention for the Safety of Life at Sea 1974 (SOLAS Convention) in relation to ship construction – fire protection, fire detection and fire extinction. The Rules give effect to amendments to Chapter II-2 adopted by the Maritime Safety Committee of the International Maritime Organization (IMO MSC) up to and including amendments adopted at the 98th session of the IMO MSC which came into force internationally on 1 January 2020.

The Rules apply to ships registered in the State, the keel of which was laid or which was at a similar stage of construction on or after 1 September 1984, certain ships which are converted into a passenger ship after 1 September 1984, and to certain repairs, alterations, modifications and outfitting of ships as specified in the Rules. For ships that are engaged on international voyages, separate rules apply to such ships constructed on or after 1 July 2002.

The Rules revoke the Merchant Shipping (Fire Protection) Rules 1985 (S.I. No. 279 of 1985) and the Merchant Shipping (Fire Protection) (Amendment) Rules 1990 (S.I. No. 86 of 1990).

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