



STATUTORY INSTRUMENTS.

S.I. No. 380 of 2023



MERCHANT SHIPPING (FIRE PROTECTION) (NO. 2) RULES 2023

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MERCHANT SHIPPING (FIRE PROTECTION) (NO. 2) RULES 2023

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MERCHANT SHIPPING (FIRE PROTECTION) (NO. 2) RULES 2023

I, JACK CHAMBERS, Minister of State at the Department of Transport, in exercise of the powers conferred on me by section 84 of the Merchant Shipping Act 2010 (No. 14 of 2010), as adapted by the Transport (Alteration of Name of Department and Title of Minister) Order 2011 (S.I. No. 141 of 2011) 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

Citation

1. These Rules may be cited as the Merchant Shipping (Fire Protection) (No. 2) Rules 2023.

Interpretation

2. (1) In these Rules –

“accommodation spaces” means –

- (a) public spaces;
- (b) corridors;
- (c) lavatories;
- (d) cabins;
- (e) offices;
- (f) hospitals;
- (e) cinemas;
- (f) game and hobby rooms;
- (g) barber shops;
- (h) pantries containing no cooking appliances, and similar spaces;

“A’ class division” means a division formed by bulkheads and decks which is:

- (a) constructed of steel or other equivalent material;
- (b) suitably stiffened;
- (c) insulated with approved non-combustible materials such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C above the original temperature, within the time listed below:

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

Class "A-60" 60 minutes

Class "A-30" 30 minutes

Class "A-15" 15 minutes

Class "A-0" 0 minutes;

- (d) so constructed as to be capable of preventing the passage of smoke and flame to the end of the 60 minute standard fire test; and
- (e) the Minister has required a test of a prototype bulkhead or deck in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for integrity and temperature rise;

“all ships” means ships, irrespective of type, constructed before, on or after 1 July 2002;

“atrium” means a public space within a single main vertical zone spanning 3 or more open decks;

“automatic fire damper” means a fire damper that closes independently in response to exposure to fire products;

“automatic smoke damper” means a smoke damper that closes independently in response to exposure to smoke or hot gases;

“‘B’ class division” means a division formed by bulkheads, decks, ceilings or linings which:

- (a) is constructed of approved non-combustible materials and all materials used in the construction and erection of a "B" class division are non-combustible, with the exception that combustible veneers may be permitted provided they meet other appropriate requirements of these Rules;
- (b) has an insulation value such that the average temperature of the unexposed side will not rise more than 140°C above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C above the original temperature, within the time listed below:

Class "B-15" 15 minutes

Class "B-0" 0 minutes;

- (c) is 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; and
- (d) the Minister has required a test of a prototype division in accordance with the Fire Test Procedures Code to ensure that it meets the above requirements for integrity and temperature rise;

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

“cabin balcony” means an open deck space that is provided for the exclusive use of the occupants of a single cabin and has direct access from such a cabin;

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

- (a) cargo holds, cargo tanks, slop tanks and cargo pump-rooms including pump-rooms, cofferdams, ballast and void spaces adjacent to cargo tanks, and
- (b) deck areas throughout the entire length and breadth of the part of a ship over the spaces mentioned in paragraph (a);

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

“cargo spaces” means spaces used for cargo, cargo oil tanks, tanks for other liquid cargo and trunks to such spaces;

“central control station” means a control station in which the following control and indicator functions are centralised:

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

“‘C’ class division” means a division constructed of approved non-combustible materials which is not required to meet requirements relative to the passage of smoke and flame or limitations relative to the temperature rise. Combustible veneers shall be permitted provided they meet the requirements of these Rules;

“chemical tanker” means a cargo ship constructed or adapted and used for the carriage in bulk of any liquid product of a flammable nature listed in Chapter 17 of the International Bulk Chemical Code;

“closed ro-ro space” means a ro-ro space which is neither an open ro-ro space nor a weather deck;

“closed vehicle space” means a vehicle space that is neither an open vehicle space nor a weather deck;

“combination carrier” means a cargo ship designed to carry both oil and solid cargoes in bulk;

“combustible material” means any material other than a non-combustible material;

“continuous ‘B’ class ceiling or lining” means a ‘B’ class ceiling or lining that terminates 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 stations” means spaces in which the ship’s radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralised. Spaces where the fire recording or fire control equipment is centralised are also considered to be a fire control station;

“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 those goods referred to in the IMDG Code;

“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;

“fire damper” means, for the purpose of implementing Rules 68, 69, 70, 71, 72, 73, 74 and 75, a device installed in a ventilation duct, which under normal conditions remains open allowing flow in the duct, and is closed during a fire, preventing the flow in the duct to restrict the passage of fire;

“Fire Protection Rules” means Merchant Shipping (Fire Protection) Rules 2023 (S.I. No. 379 of 2023);

“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 present Safety Convention concerning the amendment procedures applicable to the Annex other than Chapter I;

“Fire Test Procedures Code” means:

- (a) 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 present Safety Convention concerning the amendment procedures applicable to the Annex other than Chapter I; or
- (b) in the case of a ship constructed on or after 1 July 2012, the International Code for Application of Fire Test Procedures, 2010 (2010 FTP Code) as adopted by the Maritime Safety Committee of the IMO by resolution MSC.307(88), 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;

“flashpoint” means the temperature in degrees Celsius (closed cup test) at which a product will give off enough flammable vapour to be ignited, as determined by an approved flashpoint apparatus;

“gas carrier” means a cargo ship constructed or adapted and used for the carriage in bulk of any liquefied gas or other products of a flammable nature listed in Chapter 19 of the International Gas Carrier Code;

“helicopter facility” means a helideck including any refuelling and hangar facilities;

“helicopter landing area” means an area on a ship designated for occasional or emergency landing of helicopters but not designed for routine helicopter operations;

“helideck” means a purpose-built helicopter landing area located on a ship including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters;

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

“International Gas Carrier Code” means the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk as adopted by the Maritime Safety Committee of the IMO by resolution MSC.5(48), 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;

“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;

“load line length” means the length of a ship as ascertained in accordance with the Merchant Shipping (Load Line) Rules 2001 (S.I. No. 424 of 2001);

“low flame-spread” means that the surface thus described will adequately restrict the spread of flame, this being determined in accordance with the Fire Test Procedures Code;

“machinery spaces” means machinery spaces of category A and other spaces containing propulsion machinery, boilers, oil fuel units, steam and internal combustion engines, generators and major electrical machinery, oil filling stations, refrigerating, stabilizing, ventilation and air conditioning machinery, and similar spaces, and trunks to such spaces;

“machinery spaces of category A” means those spaces and trunks to such spaces that contain either:

- (a) internal combustion machinery used for main propulsion;
- (b) internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375kW; or
- (c) any oil-fired boiler or oil fuel unit, or any oil-fired equipment other than boilers, such as inert gas generators or incinerators;

“main vertical zones” means 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;

“manual fire damper” means a fire damper that is intended to be opened or closed by the crew by hand at the damper itself;

“manual smoke damper” means a smoke damper intended to be opened or closed by the crew by hand at the damper itself;

“non-combustible material” means 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 the Fire Test Procedures Code;

“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 oil pressure pumps, filters and heaters dealing with oil at a pressure greater than 0.18 N/mm²;

“open ro-ro space” means those ro-ro spaces that are either open at both ends or have an opening at one end, and are provided with adequate natural ventilation effective over their entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10 per cent of the total area of the space sides;

“open vehicle space” means a vehicle space that is either open at both ends, or has an opening at one end and is provided with adequate natural ventilation effective over the entire length through permanent openings distributed in the side plating or deckhead or from above, having a total area of at least 10 per cent of the total area of the space sides;

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

“prescriptive requirements” means the construction characteristics, limiting dimensions, or fire safety systems specified in Part 2, 3, 4, 5 or 7;

“public spaces” means those portions of the accommodation that are used for halls, dining rooms, lounges and similar permanently enclosed spaces;

“remotely operated fire damper” means a fire damper that is closed by the crew through a control located at a distance away from the controlled damper;

“remotely operated smoke damper” means a smoke damper that is closed by the crew through a control located at a distance away from the controlled damper;

“rooms containing furniture and furnishings of restricted fire risk” for the purpose of Rules 46 to 75 means those rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) in which:

- (a) case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, are 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;
- (b) free-standing furniture such as chairs, sofas or tables are constructed with frames of non-combustible materials;
- (c) draperies, curtains and other suspended textile materials 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;
- (d) floor coverings have low flame-spread characteristics;
- (e) exposed surfaces of bulkheads, linings and ceilings have low flame-spread characteristics;
- (f) upholstered furniture has qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code; and
- (g) bedding components have qualities of resistance to the ignition and propagation of flame, this being determined in accordance with the Fire Test Procedures Code;

“ro-ro spaces” means spaces not normally subdivided in any way and normally extending to either a substantial length or the entire length of the ship in which motor vehicles with fuel in their tanks for their own propulsion and/or 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 spaces or special category spaces;

“safe area” in the context of a casualty means, from the perspective of habitability, any area(s) which is not flooded or which is outside the main vertical zone(s) in which a fire has occurred such that it can safely accommodate all persons on board to protect them from hazards to life or health and provide them with basic services;

“safety centre” means a control station dedicated to the management of emergency situations. Safety systems’ operation, control and/or monitoring are an integral part of the safety centre;

“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;

“sauna” means a hot room with temperatures normally varying between 80°C and 120°C where the heat is provided by a hot surface (such as by an electrically-heated oven). The hot room may also include the space where the oven is located and adjacent bathrooms;

“service spaces” means those spaces used for galleys, pantries containing cooking appliances, lockers, mail and specie rooms, storerooms, workshops other than those forming part of the machinery spaces, and similar spaces and trunks to such spaces;

“smoke damper” means a device installed in a ventilation duct which under normal conditions remains open allowing flow in the duct and is closed during a fire, preventing the flow in the duct to restrict the passage of smoke and hot gases. A smoke damper is not expected to contribute to the integrity of a fire rated division penetrated by a ventilation duct;

“special category spaces” means those enclosed vehicle spaces above and below the bulkhead deck, into and from which vehicles can be driven and to which passengers have access. Special category spaces may be accommodated on more than one deck provided that the total overall clear height for vehicles does not exceed 10m;

“standard fire test” means a test in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve in accordance with the test method specified in the Fire Test Procedures Code;

“steel or other equivalent material” means steel or any non-combustible material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable exposure to the standard fire test (an example is aluminium alloy with appropriate insulation);

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

“vehicle carrier” means a cargo ship which only carries cargo in ro-ro spaces or vehicle spaces, and which is designed for the carriage of unoccupied motor vehicles without cargo, as cargo;

“vehicle spaces” means cargo spaces intended for carriage of motor vehicles with fuel in their tanks for their own propulsion;

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

“winching area” means a pick-up area provided for the transfer by helicopter of personnel or stores to or from the ship, while the helicopter hovers above the deck.

Application

3. (1) Unless expressly provided otherwise, these Rules:
 - (a) shall apply to ships constructed on or after 1 July 2002 and engaged on international voyages;
 - (b) shall not apply to:
 - (i) ships of war and troop ships;
 - (ii) cargo ships of less than 500 tonnes gross tonnage;
 - (iii) ships not propelled by mechanical means;
 - (iv) wooden ships of primitive build;
 - (v) pleasure yachts not engaged in trade;
 - (vi) fishing vessels.
- (2) In these Rules:
 - (a) “ships constructed” means ships the keels of which are laid or which are at a similar stage of construction;
 - (b) “a similar stage of construction” means the stage at which:
 - (i) construction identifiable with a specific ship begins; and
 - (ii) 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; and
 - (c) a cargo ship, whenever built, which is converted to a passenger ship shall be treated as a passenger ship constructed on the date on which such a conversion commences.
- (3) Ships constructed before 1 July 2002 shall comply with:
 - (a) Rules 5, 7(6) and 7(8), as appropriate;
 - (b) Rules 118(1)(a) and (c), 118(2), 118(3), 118(4), 118(5), 118(6) and Part 5, with the exception of Rules 133(3) and 133(4) as appropriate;
 - (c) Rules 92(3) and 102(7), in the case of new installations only;
 - (d) Rule 101, in the case of passenger ships of 2,000 gross tonnage and greater;
 - (e) Rules 30(4)(b) and 33, in the case of a passenger ship;
 - (f) Rule 24(1).

(4) Ships constructed on or after 1 July 2002 and before 1 July 2010 shall comply with Rules 68(1), 71(4)(b), 71(4)(c) and 73(2).

(5) (a) The following ships, with cargo spaces intended for the carriage of packaged dangerous goods, shall comply with Rules 144 to 154, except when carrying dangerous goods specified as classes 6.2 and 7 in the IMDG Code and dangerous goods in limited quantities, having regard to Chapter 3.4 of the IMDG Code, and excepted quantities, having regard to Chapter 3.5 of the IMDG Code, in accordance with Tables 1 and 3 to Rule 143, not later than the date of the first renewal survey on or after 1 January 2011:

- (i) cargo ships of 500 gross tonnage and greater and passenger ships constructed on or after 1 September 1984 and before 1 January 2011; and
- (ii) cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 and before 1 January 2011.

(b) Notwithstanding the provisions of subparagraph (a):

- (i) cargo ships of 500 gross tonnage and greater and passenger ships constructed on or after 1 September 1984 and before 1 February 1992 are not required to comply with Rule 147 provided that they comply with Rule 152(5)(f) of the Fire Protection Rules;
- (ii) cargo ships of 500 gross tonnage and greater and passenger ships constructed on or after 1 September 1984 and before 1 July 1998 are not required to comply with Rule 154;
- (iii) cargo ships of less than 500 gross tonnage constructed on or after 1 February 1992 and before 1 July 1998 are not required to comply with Rule 154;
- (iv) cargo ships of 500 gross tonnage and greater and passenger ships constructed on or after 1 February 1992 and before 1 July 2002 are not required to comply with Rule 147 provided that they comply with Rule 152(5)(f) of the Fire Protection Rules; and
- (v) cargo ships of 500 gross tonnage and greater and passenger ships constructed on or after 1 September 1984 and before 1 July 2002 are not required to comply with Rules 145, 149, 150 and 153 provided that they comply with Rule 152(5)(a), (b), (c), (d), (j), (k), (l) and (o) of the Fire Protection Rules.

(6) Ships constructed before 1 July 2012 shall comply with Rule 106(1)(b).

(7) Vehicle carriers constructed before 1 January 2016, including those constructed before 1 July 2012, shall comply as appropriate with Rule 163(1)(b).

(8) Tankers constructed before 1 January 2016, including those constructed before 1 July 2012, shall comply with Rule 133(6)(a), (b) and (d).

(9) Rules 19(1) and (3) apply to ships constructed on or after 1 July 2002 and before 1 January 2016, and Rule 20 applies to all ships constructed before 1 January 2016.

(10) Rule 96(3) applies to ships constructed before 1 January 2020.

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.

(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. For the purposes of this description: (a) a ship of Class XI means a sailing ship (other than a ship of Class XII) that proceeds to sea; (b) a ship of Class XII means a pleasure craft of 13.7m in length or greater.
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), XI and XII) engaged on voyages (not being long international voyages) any of which are short international voyages.
Class VIII(T)	Tankers engaged on voyages (not being long international voyages) any of which are short international voyages.

Class IX	Tugs or tenders that proceed to sea but are not engaged on long international voyages.
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(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” has the meaning assigned to it in Rule 4(2) of the Fire Protection Rules;

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

“smooth waters” has the meaning assigned to it in Rule 4(2) of the Fire Protection Rules;

“voyage” includes an excursion.

Repairs, alterations, modifications and outfitting

5. (1) All ships that undergo repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to these ships. Such ships, if constructed before 1 July 2002, shall, as a rule, comply with the requirements for ships constructed on or after that date to at least the same extent as they did before undergoing such repairs, alterations, modifications or outfitting.

(2) Repairs, alterations and modifications that substantially alter the dimensions of a ship or the passenger accommodation spaces, or substantially increase a ship’s service life and outfitting related thereto shall meet the requirements for ships constructed on or after 1 July 2002 in so far as the Minister deems reasonable and practicable.

Exemptions

6. (1) The Minister may, if he or she considers that the sheltered nature and conditions of the voyage are such as to render the application of any specific requirements of these Rules unreasonable or unnecessary, exempt from those requirements individual ships or classes of ships which, in the course of their voyage, do not proceed more than 20 miles from the nearest land.

(2) In the case of passenger ships which are employed in special trades for the carriage of large numbers of special trade passengers, such as the pilgrim trade, the Minister, if satisfied that it is impracticable to enforce compliance with the requirements of these Rules, may exempt such ships from those requirements, provided that they comply fully with the provisions of:

- (a) the Rules annexed to the Special Trade Passenger Ships Agreement, 1971; and
- (b) the Rules annexed to the Protocol on Space Requirements for Special Trade Passenger Ships, 1973.

Application of requirements for tankers

7. (1) Requirements for tankers in these Rules shall apply to tankers carrying crude oil or petroleum products having a flashpoint not exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, and a Reid vapour pressure which is below the atmospheric pressure or other liquid products having a similar fire hazard.

(2) (a) Where liquid cargoes other than those referred to in paragraph (1), or liquefied gases which introduce additional fire hazards, are intended to be carried, additional safety measures shall be required, having due regard to the provisions of the International Bulk Chemical Code, the Bulk Chemical Code, the International Gas Carrier Code, and the Gas Carrier Code, as appropriate.

(b) A liquid cargo with a flashpoint of less than 60°C for which a regular foam fire-fighting system complying with the Fire Safety Systems Code is not effective, is considered to be a cargo introducing additional fire hazards in this context. The following additional measures are required:

- (i) the foam shall be of alcohol resistant type;
- (ii) the type of foam concentrates for use in chemical tankers shall be to the satisfaction of the Minister taking into account the IMO Guidelines for performance and testing criteria and surveys of expansion foam concentrates for fire-extinguishing systems for chemical tankers; and
- (iii) the capacity and application rates of the foam extinguishing system shall comply with Chapter 11 of the International Bulk Chemical Code, except that lower application rates may be accepted based on performance tests. For tankers fitted with inert gas systems, a quantity of foam concentrate sufficient for 20 minutes of foam generation may be accepted.

(3) For the purpose of this Rule, a liquid cargo with a vapour pressure greater than 1.013 bar absolute at 37.8°C is considered to be a cargo introducing additional fire hazards. Ships carrying such substances shall comply with paragraph 15.14 of the International Bulk Chemical Code. When ships operate in restricted areas and at restricted times, the Minister may agree to waive the requirements for refrigeration systems in accordance with paragraph 15.14.3 of the International Bulk Chemical Code.

(4) Liquid cargoes with a flashpoint exceeding 60°C other than oil products or liquid cargoes subject to the requirements of the International Bulk Chemical Code are considered to constitute a low fire risk, not requiring the protection of a fixed foam extinguishing system.

(5) Tankers carrying petroleum products with a flashpoint exceeding 60°C (closed cup test), as determined by an approved flashpoint apparatus, shall comply with Rules 80(4) and 106(4) and the requirements for cargo ships other than tankers, except that, in lieu of the fixed fire-extinguishing system required

in Rule 103, they shall be fitted with a fixed deck foam system which shall comply with the provisions of the Fire Safety Systems Code.

(6) Combination carriers constructed before, on or after 1 July 2002 shall not carry cargoes other than oil unless all cargo spaces are empty of oil and gas-freed or unless the arrangements provided in each case have been approved by the Minister taking into account the IMO Guidelines for inert gas systems.

(7) Chemical tankers and gas carriers shall comply with the requirements for tankers, except where alternative and supplementary arrangements are provided to the satisfaction of the Minister, having due regard to the provisions of the International Bulk Chemical Code and the International Gas Carrier Code, as appropriate.

(8) The requirements of Rule 27(a) and (d) shall apply, and a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted on all tankers constructed before 1 July 2002 by the date of the first scheduled dry-docking after 1 July 2002, but not later than 1 July 2005. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10 per cent of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room and cargo control room to alert personnel to the potential hazard. Existing monitoring systems already fitted that have a pre-set level not greater than 30 per cent of the lower flammable limit may be accepted.

PART 2

PREVENTION OF FIRE AND EXPLOSION

Limitations in the use of oils as fuel

8. The following limitations shall apply to the use of oil as fuel:

(1) except as otherwise permitted by this Rule, oil fuel with a flashpoint of less than 60°C shall not be used;

(2) in emergency generators, oil fuel with a flashpoint of not less than 43°C may be used;

(3) the use of oil fuel having a flashpoint of less than 60°C but not less than 43°C may be permitted in certain circumstances such as for feeding the emergency fire pump's engines and the auxiliary machines which are not located in the machinery spaces of category A, subject to the following conditions:

- (a) fuel oil tanks, except those arranged in double bottom compartments, shall be located outside of machinery spaces of category A;
- (b) provisions for the measurement of oil temperature are provided on the suction pipe of the oil fuel pump;
- (c) stop valves and/or cocks are provided on the inlet side and outlet side of the oil fuel strainers; and

- (d) pipe joints of welded construction or of circular cone type or spherical type union joint are applied as much as possible;
- (4) (a) in gas carriers to which Part G of Chapter II-1 of the Safety Convention is not applicable and which use their cargoes as fuel and comply with the requirements of the International Gas Carrier Code, or which use other low-flashpoint gaseous fuels provided that the fuel storage and distribution systems design and arrangements for such gaseous fuels comply with the requirements of the International Gas Carrier Code for gas as a cargo, the use of fuel having a lower flashpoint than otherwise specified in this Rule may be permitted provided that such fuel is not stored in any machinery space and subject to approval by the Minister;
- (b) in cargo ships to which Part G of Chapter II-1 of the Safety Convention is applicable, the use of oil fuel having a lower flashpoint than otherwise specified in this Rule is permitted in compliance with the requirements of the International Code of Safety for Ships using Gases or Other Low-flashpoint Fuels (IGF Code) in its updated version.

Arrangements for oil fuel

9. In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety of the ship and persons on board and shall at least comply with the following provisions:

(1) As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm² shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.

(2) The ventilation of machinery spaces shall be sufficient under normal conditions to prevent accumulation of oil vapour.

(3) Fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks.

(4) As far as practicable, oil fuel tanks shall be part of the ships structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of category A, they shall not contain oil fuel having a flashpoint of less than 60°C. In general, the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed, their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placed in an oil-tight spill

tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

(5) An oil fuel tank shall not be situated where spillage or leakage therefrom can constitute a fire or explosion hazard by falling on heated surfaces.

(6) Where oil fuel pipes, if damaged, would allow oil to escape from a storage, settling or daily service tank having a capacity of 500 litres and greater situated above the double bottom, the oil fuel pipes shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted, but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such an additional valve is fitted in the machinery space, it shall be operated from a position outside this space. The controls for remote operation of the valve for the emergency generator fuel tank shall be in a separate location from the controls for remote operation of other valves for tanks located in machinery spaces.

- (7) (a) A safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided.
- (b) Where sounding pipes are used, they shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they shall not terminate in passenger or crew spaces. As a general rule, they shall not terminate in machinery spaces. However, where the Minister considers that these latter requirements are impracticable, termination of sounding pipes in machinery spaces may be permitted subject to all of the following requirements being met:
- (i) an oil-level gauge is provided that meets the requirements of subparagraph (c);
 - (ii) the sounding pipes terminate in locations remote from ignition hazards unless precautions are taken, such as the fitting of effective screens, to prevent the oil fuel in the case of spillage through the terminations of the sounding pipes from coming into contact with a source of ignition; and
 - (iii) the termination of sounding pipes are fitted with self-closing blanking devices and with a small-diameter self-closing control cock located below the blanking device for the purpose of ascertaining, before the blanking device is opened, that oil fuel is not present. Provisions shall be made so as to ensure that any spillage of oil fuel through the control cock involves no ignition hazard.
- (c) Other oil-level gauges may be used in place of sounding pipes, subject to the following conditions:
- (i) in a passenger ship, such gauges shall not require penetration below the top of the tank and their failure or overfilling of the tanks shall not permit release of fuel; and

(ii) in a cargo ship, the failure of such gauges or overfilling of the tank shall not permit release of fuel into the space. The use of cylindrical gauge glasses is prohibited. The Minister may permit the use of oil-level gauges with flat glasses and self-closing valves between the gauges and fuel tanks.

(d) The means prescribed in subparagraph (c) that are acceptable to the Minister shall be maintained in proper condition to ensure their continued accurate functioning in service.

(8) Provisions shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes served by pumps on board. Air and overflow pipes and relief valves shall discharge to a position where there is no risk of fire or explosion from the emergence of oils and vapour and shall not lead into crew spaces, passenger spaces nor into special category spaces, closed ro-ro cargo spaces, machinery spaces or similar spaces.

(9) Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that restricted use of flexible pipes shall be permissible in positions where the Minister is satisfied that they are necessary having regard to the recommendations published by the International Organisation for Standardization, in particular ISO 15540:1999 and ISO 15541:1999. Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Minister. For valves fitted to oil fuel tanks and which are under static pressure, steel or spheroidal-graphite cast iron may be accepted. However, ordinary cast iron valves may be used in piping systems where the design pressure is lower than 7 bar and the design temperature is below 60°C.

(10) External high-pressure fuel delivery lines between the high-pressure fuel pumps and fuel injectors shall be protected with a jacketed piping system capable of containing fuel from a high-pressure line failure. A jacketed pipe incorporates an outer pipe into which the high-pressure fuel pipe is placed, forming a permanent assembly. The jacketed piping system shall include a means for collection of leakages and arrangements shall be provided with an alarm in case of a fuel line failure.

(11) Oil fuel lines shall not be located immediately above or near units of high temperature including boilers, steam pipelines, exhaust manifolds, silencers or other equipment required to be insulated in accordance with paragraph (15). As far as practicable, oil fuel lines shall be arranged far apart from hot surfaces, electrical installations or other sources of ignition and shall be screened or otherwise suitably protected to avoid oil spray or oil leakage onto the sources of ignition. The number of joints in such piping systems shall be kept to a minimum.

(12) Components of a diesel engine fuel system shall be designed considering the maximum peak pressure which will be experienced in service, including any high pressure pulses which are generated and transmitted back into the fuel supply and spill lines by the action of fuel injection pumps. Connections within the fuel supply and spill lines shall be constructed having regard to their ability to prevent pressurized oil fuel leaks while in service and after maintenance.

(13) In multi-engine installations that are supplied from the same fuel source, means of isolating the fuel supply and spill piping to individual engines shall be provided. The means of isolation shall not affect the operation of the other engines and shall be operable from a position not rendered inaccessible by a fire on any of the engines.

(14) Where the Minister permits the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Minister having regard to the fire risk.

- (15) (a) Surfaces with temperatures above 220°C, which may be impinged as a result of a fuel system failure, shall be properly insulated.
- (b) Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

Arrangements for lubricating oil

10. (1) The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board.

(2) The arrangements made in machinery spaces of category A, and whenever practicable in other machinery spaces, shall at least comply with Rule 9(1), (5) to (9), (11) and (15) except that:

- (a) this does not preclude the use of sight-flow glasses in lubricating systems provided that they are shown by testing to have a suitable degree of fire resistance; and
- (b) sounding pipes may be authorized in machinery spaces; however, the requirements of Rule 9(7)(b)(i) and (iii) are not required to be applied on condition that the sounding pipes are fitted with appropriate means of closure.

(3) Rule 9(6) shall also apply to lubricating oil tanks except those having a capacity less than 500 litres, storage tanks on which valves are closed during the normal operation mode of the ship, or where it is determined that an unintended operation of a quick closing valve on the oil lubricating tank would endanger the safe operation of the main propulsion and essential auxiliary machinery.

Arrangements for other flammable oils

11. (1) The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board.

(2) Suitable oil collecting arrangements for leaks shall be fitted below hydraulic valves and cylinders. In locations where means of ignition are present, such arrangements shall at least comply with Rule 9(5), (7)(a), (11) and (15) and with Rule 9(8) and (9) in respect of strength and construction.

Arrangements for oil fuel in periodically unattended machinery spaces

12. In addition to the requirements of Rules 9, 10 and 11, the oil fuel and lubricating oil systems in a periodically unattended machinery space shall comply with the following:

(1) where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically, including oil fuel purifiers, which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages; and

(2) where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

Arrangements for gaseous fuel for domestic purposes

13. (1) Gaseous fuel systems used for domestic purposes shall be approved by the Minister.

(2) Storage of gas bottles shall be located on the open deck or in a well-ventilated space that opens only to the open deck.

Miscellaneous items of ignition sources and ignitability

14. (1) Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

(2) Waste receptacles shall be constructed of non-combustible materials with no openings in the sides or bottom.

(3) In spaces where penetration of oil products is possible, the surface of insulation shall be protected against and be impervious to oil or oil vapours.

(4) Primary deck coverings, if applied within accommodation and service spaces and control stations, or if applied on cabin balconies of a passenger ship constructed on or after 1 July 2008, shall be of approved material which will not readily ignite, this being determined in accordance with the Fire Test Procedures Code.

Cargo areas of tankers – separation of cargo oil tanks

15. (1) Cargo pump-rooms, cargo tanks, slop tanks and cofferdams shall be positioned forward of machinery spaces. However, oil fuel bunker tanks are not required to be forward of machinery spaces. Cargo tanks and slop tanks shall be isolated from machinery spaces by cofferdams, cargo pump-rooms, oil bunker tanks or ballast tanks. Pump-rooms containing pumps and their accessories for ballasting those spaces situated adjacent to cargo tanks and slop tanks and pumps for oil fuel transfer shall be considered as equivalent to a cargo pump-room

within the context of this Rule provided that such pump-rooms have the same safety standard as that required for cargo pump-rooms. Pump-rooms intended solely for ballast or oil fuel transfer are not required to comply with Rule 105. The lower portion of the pump-room may be recessed into machinery spaces of category A to accommodate pumps, provided that the deck head of the recess is in general not more than one third of the moulded depth above the keel, except that in the case of ships of not more than 25,000 tonnes deadweight, where it can be demonstrated that for reasons of access and satisfactory piping arrangements this is impracticable, the Minister may permit a recess in excess of such height, but not exceeding one half of the moulded depth above the keel.

(2) Main cargo control stations, control stations, accommodation and service spaces (excluding isolated cargo handling gear lockers) shall be positioned aft of cargo tanks, slop tanks, and spaces which isolate cargo or slop tanks from machinery spaces, but not necessarily aft of the oil fuel bunker tanks and ballast tanks, and shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into an accommodation space, main cargo control stations, control station, or service spaces. A recess provided in accordance with paragraph (1) is not required to be taken into account when the position of these spaces is being determined.

(3) Where deemed necessary, the Minister may permit main cargo control stations, control stations, accommodation and service spaces forward of the cargo tanks, slop tanks and spaces which isolate cargo and slop tanks from machinery spaces, but not necessarily forward of oil fuel bunker tanks or ballast tanks. Machinery spaces, other than those of category A, may be permitted forward of the cargo tanks and slop tanks provided they are isolated from the cargo tanks and slop tanks by cofferdams, cargo pump-rooms, oil fuel bunker tanks or ballast tanks, and have at least one portable fire extinguisher. In cases where they contain internal combustion machinery, one approved foam-type extinguisher of at least 45 litres capacity or equivalent shall be arranged in addition to portable fire extinguishers. If operation of a semi-portable fire extinguisher is impracticable, this fire extinguisher may be replaced by two additional portable fire extinguishers. Accommodation spaces, main cargo control spaces, control stations and service spaces shall be arranged in such a way that a single failure of a deck or bulkhead shall not permit the entry of gas or fumes from the cargo tanks into such spaces. In addition, where deemed necessary for the safety or navigation of the ship, the Minister may permit machinery spaces containing internal combustion machinery, not being main propulsion machinery having an output greater than 375 kW, to be located forward of the cargo area provided the arrangements are in accordance with the provisions of this paragraph.

(4) The following provisions apply in combination carriers only:

- (a) The slop tanks shall be surrounded by cofferdams except where the boundaries of the slop tanks are part of the hull, main cargo deck, cargo pump-room bulkhead or oil fuel bunker tank. These cofferdams shall not be open to a double bottom, pipe tunnel, pump-room or other enclosed space, nor shall they be used for cargo or ballast and shall not be connected to piping systems serving oil cargo or ballast. Means shall be provided for filling

the cofferdams with water and for draining them. Where the boundary of a slop tank is part of the cargo pump-room bulkhead, the pump-room shall not be open to the double bottom, pipe tunnel or other enclosed space; however, openings provided with gastight bolted covers may be permitted;

- (b) Means shall be provided for isolating the piping connecting the pump-room with the slop tanks referred to in subparagraph (a). The means of isolation shall consist of a valve followed by a spectacle flange or a spool piece with appropriate blank flanges. This arrangement shall be located adjacent to the slop tanks, but where this is unreasonable or impracticable, it may be located within the pump-room directly after the piping penetrates the bulkhead. A separate permanently installed pumping and piping arrangement incorporating a manifold, provided with a shut-off valve and a blank flange, shall be provided for discharging the contents of the slop tanks directly to the open deck for disposal to shore reception facilities when the ship is in the dry cargo mode. When the transfer system is used for slop transfer in the dry cargo mode, it shall have no connection to other systems. Separation from other systems by means of removal of spool pieces may be accepted;
- (c) Hatches and tank cleaning openings to slop tanks shall only be permitted on the open deck and shall be fitted with closing arrangements. Except where they consist of bolted plates with bolts at watertight spacing, these closing arrangements shall be provided with locking arrangements under the control of the responsible ship's officer; and
- (d) Where cargo wing tanks are provided, cargo oil lines below deck shall be installed inside these tanks. The Minister may permit cargo oil lines to be placed in special ducts provided these are capable of being adequately cleaned and ventilated to the satisfaction of the Minister. Where cargo wing tanks are not provided, cargo oil lines below deck shall be placed in special ducts.

(5) Where the fitting of a navigation position above the cargo area is shown to be necessary, it shall be for navigation purposes only and it shall be separated from the cargo tank deck by means of an open space with a height of at least 2 m. The fire protection requirements for such a navigation position shall be that required for control stations, as specified in Rule 60 and other provisions for tankers, as applicable.

(6) Means shall be provided to keep deck spills away from the accommodation and service areas. This may be accomplished by provision of a permanent continuous coaming of a height of at least 300 mm, extending from side to side. Special consideration shall be given to the arrangements associated with stern loading.

Cargo areas of tankers – restriction on boundary openings

16. (1) Except as permitted in paragraph (2), 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. This distance need not exceed 5 m.

(2) The Minister may permit access doors in boundary bulkheads facing the cargo area or within the 5 m limits specified in paragraph (1), to main cargo control stations and to such service spaces used as provision rooms, store-rooms and lockers, provided they do not give access directly or indirectly to any other space containing or providing 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" class 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 (1). Wheelhouse doors and windows may be located within the limits specified in paragraph (1) so long as they are designed to ensure that the wheelhouse can be made rapidly and efficiently gas and vapour tight.

(3) Windows and sidescuttles facing the cargo area and on the sides of the superstructures and deckhouses within the limits specified in paragraph (1) shall be of the fixed (non-opening) type. Such windows and sidescuttles, except wheelhouse windows, shall be constructed to "A-60" class standard except in the case of a ship constructed on or after 1 July 2008, where "A-O" class standard is acceptable for windows and sidescuttles outside the limit specified in Rule 60(5).

(4) Where there is permanent access from a pipe tunnel to the main pump-room, a watertight door shall be fitted complying with the following requirements:

- (a) doors provided to ensure the watertight integrity of internal openings which are used while at sea shall be sliding watertight doors capable of being remotely closed from the bridge and shall be operable locally from each side of the bulkhead. Indicators shall be provided at the control position showing whether the doors are open or closed and an audible alarm shall be provided at the door closure. The power, control and indicators shall be operable in the event of main power failure and particular attention shall be paid to minimising the effect of control system failure. Each power-operated sliding watertight door shall be provided with an individual hand-operated mechanism and it shall be possible to open and close the door by hand at the door itself from both sides;
- (b) in addition to the bridge operation, the watertight door shall be capable of being manually closed from outside the main pump-room entrance; and
- (c) the watertight door shall be kept closed during normal operations of the ship except when access to the pipe tunnel is required.

(5) 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 integrity and gas tightness of the bulkhead or deck is maintained.

(6) The arrangement of ventilation inlets and outlets and other deckhouse and superstructure boundary space openings shall be such as to complement the provisions of Rule 17 and Rule 112. Such vents, especially for machinery spaces, shall be situated as far aft as practicable. Due consideration in this regard shall be given when the ship is equipped to load or discharge at the stern. Sources of ignition such as electrical equipment shall be so arranged as to avoid an explosion hazard.

Cargo tank venting

17. (1) The venting systems of cargo tanks shall be entirely distinct from the air pipes of the other compartments of a ship. The arrangements and position of openings in the cargo tank deck from which emission of flammable vapours can occur shall be such as to minimize the possibility of flammable vapours being admitted to enclosed spaces containing a source of ignition, or collecting in the vicinity of deck machinery and equipment which may constitute an ignition hazard. In accordance with this general principle, the criteria in paragraphs (2) to (5) and Rule 112 shall apply.

(2) The venting arrangements in each cargo tank may be independent or combined with other cargo tanks and may be incorporated into the inert gas piping.

(3) Where the arrangements are combined with other cargo tanks, either stop valves or other acceptable means shall be provided to isolate each cargo tank. Where stop valves are fitted, they shall be provided with locking arrangements which shall be under the control of the responsible ship's officer. There shall be a clear visual indication of the operational status of the valves or other acceptable means. Where tanks have been isolated, it shall be ensured that relevant isolating valves are opened before cargo loading or ballasting or discharging of those tanks is commenced. Any isolation must continue to permit the flow caused by thermal variations in a cargo tank in accordance with Rule 112(1)(a). In the case of a tanker constructed on or after 1 January 2017, any isolation shall also continue to permit the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging in accordance with Rule 112(1)(b).

(4) If cargo loading and ballasting or discharging of a cargo tank or cargo tank group is intended, which is isolated from a common venting system, that cargo tank or cargo tank group shall be fitted with a means for over-pressure or under-pressure protection as required in Rule 112(4).

(5) The venting arrangements shall be connected to the top of each cargo tank and shall be self-draining to the cargo tanks under all normal conditions of trim and list of the ship. Where it may not be possible to provide self-draining lines, permanent arrangements shall be provided to drain the vent lines to a cargo tank.

(6) The venting system shall be provided with safety devices to prevent the passage of flame into the cargo tanks. The design, testing and locating of these

devices shall comply with the European Union (Marine Equipment) Regulations 2017 (S.I. No. 177 of 2017). Ullage openings shall not be used for pressure equalization. They shall be provided with self-closing and tightly sealing covers. Flame arresters and screens are not permitted in these openings.

- (7) (a) Vent outlets for cargo loading, discharging and ballasting required by Rule 112(1)(b) shall:
- (i) permit the free flow of vapour mixtures, or
 - (ii) permit the throttling of the discharge of the vapour mixtures to achieve a velocity of not less than 30 m/s;
 - (iii) be so arranged that the vapour mixture is discharged vertically upwards;
 - (iv) where the method is by free flow of vapour mixtures, be such that the outlet shall be not less than 6 m above the cargo tank deck or fore and aft gangway if situated within 4 m of the gangway and located not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard; and
 - (v) where the method is by high-velocity discharge, be located at a height not less than 2 m above the cargo tank deck and not less than 10 m measured horizontally from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard. These outlets shall be provided with high velocity devices of an approved type.
- (b) The arrangements for the venting of vapours displaced from the cargo tanks during loading and ballasting shall comply with this Rule and Rule 112 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.

(8) In combination carriers, the arrangements for isolating slop tanks containing oil or oil residues from other cargo tanks shall consist of blank flanges which will remain in position at all times when cargoes other than liquid cargoes referred to in Rule 7(1) are carried.

Ventilation

18. (1) Cargo pump-rooms shall be mechanically ventilated and discharges from the exhaust fans shall be led to a safe place on the open deck. The ventilation of these rooms shall have sufficient capacity to minimize the possibility of accumulation of flammable vapours. The number of air changes shall be at least 20 per hour, based upon the gross volume of the space. The air

ducts shall be arranged so that all of the space is effectively ventilated. The ventilation shall be of the suction type using fans of the non-sparking type.

(2) In combination carriers, cargo spaces and any enclosed spaces adjacent to cargo spaces shall be capable of being mechanically ventilated. The mechanical ventilation may be provided by portable fans. An approved fixed gas warning system capable of monitoring flammable vapours shall be provided in cargo pump-rooms, pipe ducts and cofferdams, as referred to in Rule 15(4), adjacent to slop tanks. Suitable arrangements shall be made to facilitate measurement of flammable vapours in all other spaces within the cargo area. Such measurements shall be made possible from the open deck or easily accessible positions.

Inert gas systems – application

19. (1) In the case of tankers of 20,000 tonnes deadweight and greater constructed on or after 1 July 2002 and before 1 January 2016, the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that, in lieu of the above, the Minister, after having given consideration to the ship's arrangement and equipment, may accept other fixed installations if they afford equivalent protection. The requirements for alternative fixed installations shall comply with the requirements in Rule 22.

(2) In the case of tankers of 8,000 tonnes deadweight and greater constructed on or after 1 January 2016 when carrying cargoes described in Rule 7(1) and (2), the protection of the cargo tanks shall be achieved by a fixed inert gas system in accordance with the requirements of the Fire Safety Systems Code, except that the Minister may accept other equivalent systems or arrangements that comply with the requirements in Rule 22.

(3) Tankers operating with a cargo tank cleaning procedure using crude oil washing shall be fitted with an inert gas system complying with the Fire Safety Systems Code and with fixed tank washing machines. Inert gas systems fitted on tankers constructed on or after 1 July 2002 and before 1 January 2016 shall comply with the Fire Safety Systems Code.

(4) Tankers required to be fitted with inert gas systems shall comply with the following provisions:

- (a) double hull spaces shall be fitted with suitable connections for the supply of inert gas;
- (b) where hull 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; and
- (c) 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.

Inert gas systems of chemical tankers and gas carriers

20. The requirements for inert gas systems contained in the Fire Safety Systems Code are not required to be applied to chemical tankers constructed before 1 January 2016 and all gas carriers:

(1) when carrying cargoes described in Rule 7(1), provided that they comply with the Regulation for inert gas systems on chemical tankers adopted by the IMO by Resolution A.567(14) and Corr.1; or

(2) when carrying flammable cargoes other than crude oil or petroleum products such as cargoes listed in Chapters 17 and 18 of the International Bulk Chemical Code, 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 m³/h.

General requirements for inert gas systems

21. (1) The inert gas system shall be capable of inerting, purging and gas freeing empty tanks and maintaining the atmosphere in cargo tanks with the required oxygen content.

(2) Tankers fitted with a fixed inert gas system shall be provided with a closed ullage system.

Requirements for equivalent systems

22. (1) The Minister may, having considered a ship's arrangement and equipment, accept other fixed installations that comply with paragraph (3).

(2) In the case of a tanker of 8,000 tonnes deadweight and greater but less than 20,000 tonnes deadweight constructed on or after 1 January 2016, in lieu of fixed installations as required by paragraph (1), the Minister may accept other equivalent arrangements or means of protection that comply with paragraph (3).

(3) Where an installation equivalent to a fixed inert gas system or an equivalent arrangement is installed, it shall:

- (a) be capable of preventing dangerous accumulations of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operations; and
- (b) be so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

Inerting, purging and gas freeing

23. (1) Arrangements for purging and/or gas freeing shall be such as to minimize the hazards due to dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

(2) The procedure for cargo tank purging and/or gas freeing shall be carried out in accordance with Rule 133.

(3) The arrangements for inerting, purging or gas-freeing of empty tanks as required in Rule 21(1) shall be to the satisfaction of 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, the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with Rules 17 and 112. The inlet of such outlet pipes may be located either at deck level or at not more than 1 m above the bottom of the tank;
- (b) the cross-sectional area of such 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; and
- (c) each gas outlet referred to in subparagraph (b) shall be fitted with suitable blanking arrangements.

Gas measurement and detection

24. (1) Tankers, including tankers constructed prior to 1 July 2002, 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.

(2) In double-hull and double-bottom spaces, suitable portable instruments for measuring oxygen and flammable vapour concentrations shall be provided. In selecting these instruments, due attention shall be given to their use in combination with the fixed gas sampling line systems referred to in paragraph (3).

(3) Where the 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 gas sampling lines shall be adapted to the design of such spaces.

(4) In double-hull and double-bottom spaces, the materials of construction and the dimensions of gas sampling lines shall be such as to prevent restriction. Where plastic materials are used, they shall be electrically conductive.

- (5) (a) In addition to the requirements in paragraphs (1), (2), (3) and (4), an oil tanker of 20,000 tonnes deadweight and greater constructed on or after 1 January 2012 shall be provided with a fixed hydrocarbon gas detection system complying with the Fire Safety Systems Code for measuring hydrocarbon gas concentrations in all ballast tanks and void spaces of double-hull and double-bottom spaces adjacent to the cargo tanks, including the forepeak tank and any other tanks and spaces under the bulkhead deck adjacent to cargo tanks.

- (b) Oil tankers provided with constant operative inerting systems for such spaces as those referred to in subparagraph (a), are not required to be equipped with fixed hydrocarbon gas detection equipment.
- (c) A cargo pump-room that is subject to Rule 27 is not required to comply with the requirements of this paragraph.

Air supply to double hull and double bottom spaces

25. Double hull and double bottom spaces shall be fitted with suitable connections for the supply of air.

Protection of cargo area

26. Drip pans for collecting cargo residues in cargo lines and hoses shall be provided in the area of pipe and hose connections under the manifold area. Cargo hoses and tank washing hoses shall have electrical continuity over their entire lengths including couplings and flanges (except shore connections) and should be earthed for removal of electrostatic charges.

Protection of cargo pump-rooms

27. The following requirements shall apply in tankers:
- (a) cargo pumps, ballast pumps and stripping pumps, installed in cargo pump-rooms and driven by shafts passing through pump-room bulkheads shall be fitted with temperature sensing devices for bulkhead shaft glands, bearings and pump casings. A continuous audible and visual alarm signal shall be automatically effected in the cargo control room or the pump control station;
 - (b) lighting in cargo pump-rooms, except emergency lighting, shall be interlocked with ventilation such that the ventilation shall be in operation when switching on the lighting. Failure of the ventilation system shall not cause the lighting to go out;
 - (c) a system for continuous monitoring of the concentration of hydrocarbon gases shall be fitted. Sampling points or detector heads shall be located in suitable positions in order that potentially dangerous leakages are readily detected. When the hydrocarbon gas concentration reaches a pre-set level which shall not be higher than 10 per cent of the lower flammable limit, a continuous audible and visual alarm signal shall be automatically effected in the pump-room, engine control room, cargo control room and navigation bridge to alert personnel to the potential hazard; and
 - (d) all pump-rooms shall be provided with bilge level monitoring devices together with appropriately located alarms.

Control of air supply and flammable liquid to the space

28. (1) The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate whether the shutoff is open or closed.

(2) Power ventilation of accommodation spaces, service spaces, cargo spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position shall not be readily cut off in the event of a fire in the spaces served.

(3) In a passenger ship carrying more than 36 passengers, power ventilation, except machinery space and cargo space ventilation and any alternative system which may be required in accordance with Rule 42, shall be fitted with controls so grouped that all fans may be stopped from either of two separate positions which shall be situated as far apart as practicable. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.

Means of control in machinery spaces

29. (1) Means of control shall be provided for:

- (a) opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation and closure of ventilator dampers;
- (b) stopping ventilating fans. Controls provided for the power ventilation serving machinery spaces shall be grouped so as to be operable from two positions, one of which shall be outside such spaces. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces;
- (c) stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps, lubricating oil service pumps, thermal oil circulating pumps and oil separators (purifiers). However, paragraphs (2) and (3) are not required to apply to oily water separators.

(2) The controls required in paragraph (1) and in Rule 9(6) shall be located outside the space concerned so they will not be cut off in the event of fire in the space they serve.

(3) In a passenger ship, the controls required in paragraphs (1) and (2) and in Rule 43(3) and Rule 66(4) and the controls for any required fire-extinguishing system shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Minister. Such positions shall have a safe access from the open deck.

- (4) (a) In the case of periodically unattended machinery spaces, the Minister shall give special consideration to maintaining the fire integrity of the machinery spaces, the location and centralization of the fire-extinguishing system controls, the required shutdown

arrangements, with regard, inter alia, to such matters as ventilation and fuel pumps, and that additional fire-extinguishing appliances and other fire-fighting equipment and breathing apparatus may be required.

- (b) In a passenger ship, the requirements arising from paragraph (a) shall be at least equivalent to those of machinery spaces normally attended.

Fire protection materials – use of non-combustible materials

30. (1) Insulating materials shall be non-combustible, except in cargo spaces, mail rooms, baggage rooms and refrigerated compartments of service spaces. Vapour barriers and adhesives used in conjunction with insulation, as well as the insulation of pipe fittings for cold service systems, are not required to be of non-combustible materials, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have low flame spread characteristics.

(2) In a passenger ship, except in cargo spaces, all linings, grounds, draught stops and ceilings shall be of non-combustible material except in mail rooms, baggage rooms, saunas or refrigerated compartments of service spaces.

(3) In a cargo ship, all linings, ceilings, draught stops and their associated grounds shall be of non-combustible materials in the following spaces:

- (a) accommodation and service spaces and control stations for ships where Method IC is specified as referred to in Rule 55; and
- (b) corridors and stairway enclosures serving accommodation and service spaces and control stations for ships where Method IIC and IIC are specified as referred to in Rule 55.

(4) On a passenger ship:

- (a) partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall be of non-combustible materials;
- (b) linings, ceilings and partial bulkheads or decks used to screen or to separate adjacent cabin balconies shall be of non-combustible materials.

Fire protection materials – use of combustible materials

31. (1)(a) Subject to subparagraph (b), in a passenger ship, “A”, “B” or “C” class divisions in accommodation and service spaces and cabin balconies which are faced with combustible materials, facings, mouldings, decorations and veneers shall comply with paragraphs (3), (4) and (5) and Rules 34 and 35.

- (b) The provisions of paragraph (4) are not required to be applied to cabin balconies.
- (c) Traditional wooden benches and wooden linings on bulkheads and ceilings are permitted in saunas and such materials are not

required to be subject to the calculations prescribed in paragraphs (3) and (4).

(2) In a cargo ship, non-combustible bulkheads, ceilings and linings fitted in accommodation and service spaces may be faced with combustible materials, facings, mouldings, decorations and veneers provided such spaces are bounded by non-combustible bulkheads, ceilings and linings in accordance with paragraphs (3), (4) and (5) and Rules 34(1) and 35(1).

(3) Combustible materials used on the surfaces and linings specified in paragraphs (1) and (2) shall have a calorific value not exceeding 45 MJ/m² of the area for the thickness used. The requirements of this paragraph shall not apply to the surfaces of furniture fixed to linings or bulkheads.

(4) Where combustible materials are used in accordance with paragraphs (1) or (2), they shall comply with the following requirements:

- (a) the total volume of combustible facings, mouldings, decorations and veneers in accommodation and service spaces shall not exceed a volume equivalent to 2.5 mm veneer on the combined area of the walls and ceiling linings. Furniture fixed to linings, bulkheads or decks is not required to be included in the calculation of the total volume of combustible materials; and
- (b) in the case of a ship fitted with an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code, the volume referred to in subparagraph (a) may include some combustible material used for the erection of "C" Class divisions.

(5) The following surfaces shall have low flame-spread characteristics in accordance with the Fire Test Procedures Code:

- (a) In a passenger ship:
 - (i) exposed surfaces in corridors and stairway enclosures and of bulkhead and ceiling linings in accommodation and service spaces (except saunas) and control stations;
 - (ii) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations; and
 - (iii) exposed surfaces of cabin balconies, except for natural hard wood decking systems.
- (b) In a cargo ship:
 - (i) exposed surfaces in corridors and stairway enclosures and of ceilings in accommodation and service spaces (except saunas) and control stations; and
 - (ii) surfaces and grounds in concealed or inaccessible spaces in accommodation and service spaces and control stations.

Furniture in stairway enclosures of passenger ships

32. (1) 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 determined in accordance with the Fire Test Procedures Code, and shall not restrict the passenger escape route.

(2) Notwithstanding paragraph (1), 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 non-hazardous safety equipment required by these Rules, may be permitted.

(3) Drinking water dispensers and ice cube machines may be permitted in corridors provided they are fixed and do not restrict the width of the escape routes. This applies as well to decorative flower or plant arrangements, statues or other objects of art such as paintings and tapestries in corridors and stairways.

Furniture and furnishings on cabin balconies of passenger ships

33. (1) On passenger ships, furniture and furnishings on cabin balconies shall comply with the requirements of paragraph (2) 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).

- (2) (a) 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.
- (b) Free-standing furniture such as chairs, sofas or tables shall be constructed with frames of non-combustible materials.
- (c) 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.
- (d) 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.

Paints, varnishes and other finishes

34. (1) 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 the Fire Test Procedures Code.

(2) In the case of a passenger ship constructed on or after 1 July 2008, paints, varnishes and other finishes used on exposed surfaces of cabin balconies, excluding natural hard wood decking systems, shall not be capable of producing

excessive quantities of smoke and toxic products, this being determined in accordance with the Fire Test Procedures Code.

Primary deck coverings

35. (1) Primary deck coverings, if applied within accommodation and service spaces and control stations, shall be of approved material which will not give rise to smoke or toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

(2) In the case of a passenger ship constructed on or after 1 July 2008, primary deck coverings on cabin balconies shall not give rise to smoke, toxic or explosive hazards at elevated temperatures, this being determined in accordance with the Fire Test Procedures Code.

PART 3

SUPPRESSION OF FIRE

Fire detection and alarm – general requirements

36. (1) In the case of a ship constructed on or after 1 July 2002 and before 1 July 2010, a fixed fire detection and fire alarm system shall be provided in accordance with this Rule.

(2) A fixed fire detection and fire alarm system and a sample extraction smoke detection system required in this Rule and other Rules in this Part shall be of an approved type and comply with the Fire Safety Systems Code.

(3) Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in Rule 39(1), at least one detector complying with the Fire Safety Systems Code shall be installed in each such space.

(4) In the case of a ship constructed on or after 1 July 2010, a fixed fire detection and fire alarm system for passenger ships shall be capable of remotely and individually identifying each detector and manually operated call point.

Initial and periodical tests

37. (1) The functioning of fixed fire detection and fire alarm systems required by these Rules shall be tested under varying conditions of ventilation after installation.

(2) The functioning of fixed fire detection and fire alarm systems 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.

Protection of machinery spaces

38. (1) A fixed fire detection and fire alarm system shall be installed in:
- (a) periodically unattended machinery spaces;
 - (b) machinery spaces where:
 - (i) the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; and
 - (ii) the main propulsion and associated machinery, including the main sources of electrical power, are provided with various degrees of automatic or remote control and are under continuous manned supervision from a control room; and
 - (c) in the case of a ship constructed on or after 1 July 2012, enclosed spaces containing incinerators.
- (2) (a) The fixed fire detection and fire alarm system required in accordance with paragraph (1) 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.
- (b) Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted.
- (c) 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.

Protection of accommodation and service spaces and control stations

39. (1) Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces in accordance with paragraphs (2), (3) and (4). Consideration shall be given to the installation of special purpose smoke detectors within ventilation ducting.

- (2) In a passenger ship carrying more than 36 passengers:
- (a) a fixed fire detection and fire alarm system shall be installed and arranged as to provide smoke detection in service spaces, control

stations and accommodation spaces, including corridors, stairways and escape routes within accommodation spaces;

- (b) 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, carbon dioxide rooms and similar spaces are not required to be fitted with a fixed fire detection and alarm system;
- (c) in the case of a ship constructed on or after 1 July 2010, detectors fitted in cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located.

(3) In a passenger ship carrying not more than 36 passengers, there shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by the Minister, in control stations, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces, either:

- (a) a fixed fire detection and fire alarm system so installed and arranged as to detect the presence of fire in such spaces and providing smoke detection in corridors, stairways and escape routes within accommodation spaces. In the case of a ship constructed on or after 1 July 2010, detectors fitted in cabins, when activated, shall also be capable of emitting, or cause to be emitted, an audible alarm within the space where they are located; or
- (b) an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code and so installed and arranged as to protect such spaces and, in addition, a fixed fire detection and fire alarm system and so installed and arranged as to provide smoke detection in corridors, stairways and escape routes within accommodation spaces.

(4) In a passenger ship, the entire main vertical zone containing the atrium shall be protected throughout with a smoke detection system.

(5) In a cargo ship, accommodation and service spaces and control stations shall be protected by a fixed fire detection and fire alarm system or an automatic sprinkler, fire detection and fire alarm system as set out below, depending on a protection method adopted in accordance with Rule 55:

- (a) Method IC – A fixed fire detection and fire alarm system shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.
- (b) Method IIC – An automatic sprinkler, fire detection and fire alarm system of an approved type complying with the relevant requirements of the Fire Safety Systems Code 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 shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

- (c) Method IIIC – A fixed fire detection and fire alarm system shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces providing smoke detection in corridors, stairways and escape routes within accommodation 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 shall be so installed and arranged as to provide smoke detection in all corridors, stairways and escape routes within accommodation spaces.

(6) In a passenger ship, a fixed fire detection and fire alarm system or a sample extraction smoke detection system shall be provided in any cargo space which, in the opinion of the Minister, is not accessible, except where it is shown to the satisfaction of the Minister that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

(7) Manually operated call points complying with the Fire Safety Systems Code 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.

Fire patrols in passenger ships

40. (1) In a passenger ship carrying more than 36 passengers, an efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. 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) The construction of ceiling and bulkheads shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Minister there is no risk of fire originating in such places.

(3) Each member of the fire patrol shall be provided with a two-way portable radiotelephone apparatus.

Fire alarm signalling systems in passenger ships

41. (1) A passenger ship shall at all times when at sea or in port (except when not in service) be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.

(2) The control panel of fixed fire detection and fire alarm systems shall be designed on the fail-safe principle whereby an open detector circuit shall cause an alarm condition.

- (3) In the case of a passenger ship carrying more than 36 passengers:
- (a) the fire detection alarms for the systems required by Rule 39(2) shall be 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 centralized in the same location;
 - (b) 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 and closed or off status of the detectors, alarms and fans.
 - (c) the control panel shall be continuously powered and shall 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 in Rule 1(2) of the Merchant Shipping (Passenger Ship Construction and Survey) Rules 1985 (S.I. No. 274 of 1985) unless other equivalent arrangements are accepted by the Minister.

(4) A special alarm, operated from the navigation bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system and shall be capable of being sounded independently of the alarm to the passenger spaces.

(5) A fixed fire detection and fire alarm system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which Rule 33 applies, when furniture and furnishings on such balconies are not in compliance with Rule 33(2).

Control of smoke spread – protection of control stations outside machinery spaces

42. (1) Practicable measures shall be taken for the protection of control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained so that, in the event of fire, the machinery and equipment contained therein may be supervised and continue to function effectively.

(2) Alternative and separate means of air supply shall be provided and air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimised.

(3) At the discretion of the Minister, the requirements of paragraphs (1) and (2) may not apply to control stations situated on, and opening onto, an open deck or where local closing arrangements would be equally effective. In the case of a ship constructed on or after 1 July 2010, the ventilation system serving safety centres may be derived from the ventilation system serving the navigation bridge, unless located in an adjacent main vertical zone.

Release of smoke from machinery spaces

43. (1) The provisions of this Rule apply to machinery spaces of category A and, where the Minister considers desirable, to other machinery spaces.

(2) Suitable arrangements shall be made to permit the release of smoke, in the event of fire, from the space to be protected, subject to the provisions of Rule 66(2). The normal ventilation systems may be acceptable for this purpose.

(3) Means of control shall be provided for permitting the release of smoke and such controls shall be located outside the space concerned so that, in the event of fire, they will not be cut off from the space they serve.

(4) In a passenger ship, the controls required by paragraph (3) shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Minister. Such positions shall have a safe access from the open deck.

Draught stops

44. Air spaces enclosed behind ceilings, panelling or linings shall be divided by close-fitting draught stops spaced not more than 14 m apart. In the vertical direction, such enclosed air spaces, including those behind linings of stairways and trunks, shall be closed at each deck.

Smoke extraction systems in atriums of passenger ships

45. In a passenger ship, atriums 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.

Containment of fire – thermal and structural boundaries

46. Ships of all types shall be subdivided into spaces by thermal and structural divisions having regard to the fire risks of the spaces.

Passenger ships – main vertical zones and horizontal zones

47. (1) In a ship carrying more than 36 passengers, the hull, superstructure and deckhouses shall be subdivided into main vertical zones by “A-60” class divisions. Steps and recesses shall be kept to a minimum, but where they are necessary they shall also be “A-60” class divisions. Where a category (5), (9) or (10) space defined in Rule 49(2)(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) In a passenger ship carrying not more than 36 passengers, the hull, superstructure and deckhouses in way of accommodation and service spaces shall be subdivided into main vertical zones by “A” class divisions. These divisions shall have insulation values in accordance with Tables 1 and 2 to Rule 51.

(3) As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight

subdivision bulkheads situated immediately below the bulkhead deck. 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 watertight subdivision 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.

(4) The bulkheads referred to in paragraph (3) shall extend from deck to deck and to the shell or other boundaries.

(5) Where a main vertical zone is subdivided by horizontal “A” class divisions into horizontal zones for the purpose of providing an appropriate barrier between a zone with sprinklers and a zone without sprinklers, the 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 51.

(6) Subject to paragraph (7), on a ship designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent means for controlling and limiting a fire shall be substituted and specifically approved by the Minister. Service spaces and ship stores shall not be located on ro-ro decks unless protected in accordance with the applicable requirements.

(7) Notwithstanding paragraph (6), in a ship with special category spaces, such spaces shall comply with the applicable provisions of Rules 156 to 163 and where such compliance would be inconsistent with other requirements for passenger ships specified in these Rules, the requirements of Rules 156 to 163 shall prevail.

Passenger ships – bulkheads within a main vertical zone

48. (1) In a passenger ship carrying more than 36 passengers, bulkheads which are not required to be “A” class divisions shall be at least “B” class or “C” class divisions as prescribed in Tables 1 and 2 in Rule 49.

(2) In a passenger ship carrying not more than 36 passengers, bulkheads within accommodation and service spaces which are not required to be “A” class divisions shall be at least “B” class or “C” class divisions as prescribed in Tables 1 and 2 to Rule 51. In addition, corridor bulkheads, where not required to be “A” class divisions, shall be “B” class divisions which shall extend from deck to deck except:

- (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, is acceptable in the construction of “B” class divisions, but which shall be required to meet “B” class integrity standards only in 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 system complying with the provisions of the Fire Safety Systems Code, the corridor bulkheads may terminate at a ceiling in the corridor provided such bulkheads and ceilings are of “B” class standard in compliance with Rule 51. All doors and frames in such bulkheads shall be of non-combustible materials and shall have the same fire integrity as the bulkhead in which they are fitted.

(3) Bulkheads required to be “B” class divisions, except corridor bulkheads as prescribed in paragraph (2), shall extend from deck to deck and to the shell or other boundaries. However, where a continuous “B” class ceiling or lining is fitted on both sides of a bulkhead which is at least of the same fire resistance as the adjoining bulkhead, the bulkhead may terminate at the continuous ceiling or lining.

Passenger ships – fire integrity of bulkheads and decks in ships carrying more than 36 passengers

49. (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, the minimum fire integrity of all bulkheads and decks shall be as prescribed in Tables 1 and 2. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the Tables the minimum fire integrity value of any divisions, such values shall be determined to the satisfaction of the Minister.

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

- (a) Table 1 shall apply to bulkheads not bounding either main vertical zones or horizontal zones. Table 2 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones;
- (b) (i) in order to determine the appropriate fire integrity 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. 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, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements;
- (ii) smaller, enclosed rooms within a space that have less than 30 per cent communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 1 and 2. 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, including:

spaces containing emergency sources of power and lighting;

wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the propulsion machinery space;

spaces containing centralised fire alarm equipment;

spaces containing centralised emergency public address system stations and equipment;

(2) Stairways, including:

interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto; in this connection a stairway that 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 corridors and lobbies;

(4) Evacuation stations and external escape routes, including:

survival craft stowage area;

open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations;

assembly stations, internal and external;

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 liferaft and evacuation slide embarkation areas;

(5) Open deck spaces, including:

open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces (the space outside superstructures and deckhouses);

- (6) Accommodation spaces of minor fire risk, including:
- cabins containing furniture and furnishings of restricted fire risk;
 - offices and dispensaries containing furniture and furnishings of restricted fire risk;
 - public spaces containing furniture and furnishings of restricted fire risk and having a deck area of less than 50 m²;
- (7) Accommodation spaces of moderate fire risk, including:
- spaces as in category (6) but containing furniture and furnishings of other than restricted fire risk;
 - public spaces containing furniture and furnishings of restricted fire risk and having a deck area of 50 m² or greater;
 - isolated lockers and small store-rooms in accommodation spaces having areas less than 4 m² (in which flammable liquids are not stowed);
 - sale shops, in the case of a ship constructed before 1 July 2010;
 - motion picture projection and film stowage rooms;
 - diet kitchens (containing no open flame);
 - cleaning gear lockers (in which flammable liquids are not stowed);
 - laboratories (in which flammable liquids are not stowed);
 - pharmacies;
 - small drying rooms (having a deck area of 4 m² or less);
 - specie rooms;
 - operating rooms;
- (8) Accommodation spaces of greater fire risk, including:
- public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 m² or greater;
 - barber shops and beauty parlours;
 - saunas;
 - sale shops, in the case of a ship constructed on or after 1 July 2010;
- (9) Sanitary and similar spaces, including:

communal sanitary facilities, showers, baths, water closets;

small laundry rooms;

indoor swimming pool area;

isolated pantries containing no cooking appliances in accommodation spaces;

private sanitary facilities shall be considered a portion of the space in which they are located;

- (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 which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:

ventilation and air-conditioning rooms;

windlass room;

steering gear room;

stabilizer equipment room;

electrical propulsion motor room;

rooms 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 and other closed trunks such as pipe and cable trunks;

- (11) Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk, including:

cargo oil tanks;

cargo holds, 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 as in category (10) which 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 kW driving generators, sprinkler, drencher or fire pumps, bilge pumps;

closed trunks serving the aforementioned spaces;

(12) Machinery spaces and main galleys, including:

main propulsion machinery rooms (other than electric propulsion motor rooms) and boiler rooms;

auxiliary machinery spaces other than those in categories (10) and (11) which contain internal combustion machinery or other oil-burning, heating or pumping units;

main galleys and annexes;

trunks and casings to the aforementioned spaces;

(13) Store-rooms, workshops, pantries, including:

main pantries not annexed to galleys;

main laundry;

large drying rooms (having a deck area greater than 4 m²);

miscellaneous stores;

mail and baggage rooms;

garbage rooms;

workshops (not part of machinery spaces or galleys);

lockers and store-rooms having areas greater than 4 m², other than those spaces that have provisions for the storage of flammable liquids;

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

paint lockers;

store-rooms containing flammable liquids (including dyes and medicines);

laboratories (in which flammable liquids are stowed);

- (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) notwithstanding the provisions of Rule 48, there are no special requirements for material or integrity of boundaries where only a dash appears in the Tables;
 - (e) the Minister shall determine in respect of category (5) spaces whether the insulation values in Table 1 shall apply to ends of deckhouses and superstructures, and whether the insulation values in Table 2 shall apply to weather decks. In no case shall the requirements of category (5) of Tables 1 or 2 necessitate enclosure of spaces which in the opinion of the Minister are not required to be enclosed.
- (3) 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.

TABLE 1
Bulkheads not bounding either main vertical zones or horizontal zones

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,d}	A-60 ^{b,d}	A-60 ^{b,d}	A-0 ^d	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, 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-15
Machinery spaces and main galleys (12)												A-0 ^a	A-0	A-60
Store-rooms, workshop, pantries, etc. (13)													A-0 ^a	A-0
Other spaces in which flammable liquids are stowed (14)														A-30

Notes: See notes following Table 2 to this Rule.

Notes: To be applied to Tables 1 and 2 to Rule 49.

- a Where adjacent spaces are in the same numerical category and superscript “a” appears, a bulkhead or deck between such spaces is not required to be fitted 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 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.
- d Where spaces of categories (6), (7), (8) and (9) are located completely within the outer perimeter of the assembly station, the bulkheads of these spaces may be of “B-0” class integrity. Control positions for audio, video and light installations may be considered as part of the assembly station.

Construction and arrangement of saunas

50. (1) The perimeter of the sauna shall be of “A” class boundaries and may include changing rooms, showers and toilets. The sauna shall be insulated to “A-60” standard against other spaces except those inside of the perimeter and spaces of categories (5), (9) and (10).

(2) Bathrooms with direct access to saunas may be considered as part of the saunas. In such cases, the door between the sauna and the bathroom is not required to comply with fire safety requirements.

(3) The traditional wooden lining on the bulkheads and ceiling are permitted in the sauna. The ceiling above the oven shall be lined with a non-combustible plate with an air gap of at least 30 mm. The distance from the hot surfaces to combustible materials shall be at least 500 mm or the combustible materials shall be protected.

(4) The traditional wooden benches may be used in the sauna.

(5) The sauna door shall open outwards by pushing.

(6) Electrically heated ovens shall be provided with a timer.

Passenger ships – fire integrity of bulkheads and decks in ships carrying not more than 36 passengers

51. (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of passenger ships, 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 to this Rule:

- (a) Tables 1 and 2 shall apply respectively to the bulkheads and decks separating adjacent spaces;
- (b) (i) 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 (11) below. 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, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements;
- (ii) smaller, enclosed rooms within a space that have less than 30 per cent communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 1 and 2 to this Rule. 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, including:
 - spaces containing emergency sources of power and lighting;
 - wheelhouse and chartroom;
 - spaces containing the ship's radio equipment;
 - fire control stations;
 - control room for propulsion machinery when located outside the machinery space;
 - spaces containing centralised fire alarm equipment.
- (2) Corridors, including passenger and crew corridors and lobbies.
- (3) Accommodation spaces, excluding corridors.
- (4) Stairways, including:
 - interior stairways, lifts, totally enclosed emergency escape trunks, escalators (other than those wholly contained within the machinery spaces) and enclosures thereto; in this connection, 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 lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m², and drying rooms and laundries.
- (6) Machinery spaces of category A.
- (7) Other machinery spaces, including:
 - electrical equipment rooms, auto-telephone exchange and air-conditioning duct spaces;
 - machinery spaces as defined in Rule 2, excluding machinery spaces of category A.
- (8) Cargo spaces, including all spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces.
- (9) Service spaces of high risk, including:
 - galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 4 m² or greater, spaces for the storage of flammable liquids, saunas and workshops other than those forming part of the machinery spaces.
- (10) Open decks, including:

open deck spaces and enclosed promenades having little or no fire risk. Enclosed promenades shall have no significant fire risk, meaning that furnishing shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces, being the space outside superstructures and deckhouses.

(11) Special category spaces and ro-ro spaces;

- (c) 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 system complying with the provisions of the Fire Safety Systems Code or between such zones neither of which is so protected, the higher of the two values given in the Tables shall apply;
- (d) 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 system complying with the provisions of the Fire Safety Systems Code or between such zones both of which are so protected, the lesser of the two values given in the Tables shall apply. Where a zone with sprinklers and a zone without sprinklers meet within accommodation and service spaces, the higher of the two values given in the Tables shall apply to the division between the zones.

(3) 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.

(4) External boundaries which are required in Rule 108 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries of a passenger ship to have “A” class integrity. Similarly, in such boundaries which are not required to have “A” class integrity, doors may be constructed of alternative materials where no reduction of safety occurs to the satisfaction of the Minister.

(5) A sauna shall comply with Rule 50.

TABLE 1
Fire integrity of bulkheads separating adjacent spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0 ^c	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C ^e	B-0 ^e	A-0 ^a B-0 ^e	B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	*	A-15
Accommodation spaces (3)			C ^e	A-0 ^a B-0 ^e	B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	*	A-30 A-0 ^d
Stairways (4)				A-0 ^a B-0 ^e	A-0 ^a B-0 ^e	A-60	A-0	A-0	A-15 A-0 ^d	* *	A-15
Service spaces (low risk) (5)					C ^e	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0	A-60	*	A-60
Other machinery spaces (7)							A-0 ^b	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0 ^b	*	A-30
Open decks (10)										*	A-0
Special category and ro-ro spaces (11)											A-0

See notes following Table 2 to this Rule.

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-30
Corridors	(2)	A-0	*	*	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Accommodation spaces	(3)	A-60	A-0	*	A-0	*	A-60	A-0	A-0	A-0	*	A-30 A-0 ^d
Stairways	(4)	A-0	A-0	A-0	*	A-0	A-60	A-0	A-0	A-0	*	A-0
Service spaces (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 ^f	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	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (high risk)	(9)	A-60	A-30 A-0 ^d	A-30 A-0 ^d	A-30 A-0 ^d	A-0	A-60	A-0	A-0	A-0	*	A-30
Open decks	(10)	*	*	*	*	*	*	*	*	*	-	A-0
Special category and ro-ro spaces	(11)	A-60	A-15	A-30 A-0 ^d	A-15	A-0	A-30	A-0	A-0	A-30	A-0	A-0

Notes: To be applied to both Tables 1 and 2 to Rule 51 as appropriate:

a For clarification as to which applies, see Rules 48 and 52.

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, such as in category (9). 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 and chartroom from each other may have a “B-0” rating. In the case of a ship constructed on or after 1 July 2010, a fire rating is not required for those partitions separating the navigation bridge and the safety centre when the latter is within the navigation bridge.

d See Rules 51(2)(c) and (d).

e For the application of Rule 47(2), “B-0” and “C”, where appearing in Table 1, shall be read as “A-0”.

f Fire insulation is not required to be fitted if the machinery space in category (7), in the opinion of the Minister, has little or no fire risk.

* 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 of “A” class standard. However, where a deck, except in a category (10) space, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-fighting system is fitted. For the application of Rule 47(2), an asterisk, where appearing in Table 2, except for categories (8) and (10), shall be read as “A-0”.

Protection of stairways and lifts in accommodation area

52. (1) A stairway shall be within enclosures formed of “A” class divisions, with positive means of closure at all openings, except that:

- (a) a stairway connecting only two decks is not required to be enclosed, provided the integrity of the deck is maintained by proper bulkheads or self-closing doors in one 'tween-deck space. When a stairway is closed in one 'tween-deck space, the stairway enclosure shall be protected in accordance with the Tables for decks in Rule 49 or 51; and
- (b) stairways may be fitted in the open in a public space, provided they lie wholly within the public space.

(2) Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one 'tween-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke. Machinery for lifts located within stairway enclosures shall be arranged in a separate room, surrounded by steel boundaries, except that small passages for lift cables are permitted. Lifts that open into spaces other than corridors, public spaces, special category spaces, stairways and external areas shall not open into stairways included in the means of escape.

Arrangement of cabin balconies

53. On a passenger ship constructed on or after 1 July 2008, non-load bearing partial bulkheads which separate adjacent cabin balconies shall be capable of being opened by the crew from each side for the purpose of fighting fires.

Protection of atriums

54. In the case of a ship constructed on or after 1 July 2010:

- (a) atriums shall be within enclosures formed of “A” class divisions having a fire rating determined in accordance with Table 2 to Rule 49 and Table 2 to Rule 51, as applicable;
- (b) decks separating spaces within atriums shall have a fire rating determined in accordance with Table 2 to Rule 49 and Table 2 to Rule 51, as applicable.

Cargo ships except tankers – methods of protection in accommodation area

55. (1) In accommodation and service spaces and control stations in a cargo ship, other than a tanker, one of the following methods of protection shall be adopted:

- (a) Method IC – The construction of internal divisional bulkheads of non-combustible “B” or “C” class divisions generally without the installation of an automatic sprinkler, fire detection and fire alarm

system in the accommodation and service spaces, except as required by Rule 39(5)(a); or

- (b) Method IIC – The fitting of an automatic sprinkler, fire detection and fire alarm system as required by Rule 39(5)(b) for the detection and extinction of fire in all spaces in which fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads; or
- (c) Method IIIC – The fitting of a fixed fire detection and fire alarm system as required by Rule 39(5)(c), in spaces in which a fire might be expected to originate, generally with no restriction on the type of internal divisional bulkheads, except that in no case must the area of any accommodation space or spaces bounded by an “A” or “B” class division exceed 50m².

(2) The requirements for the use of non-combustible materials in the construction and insulation of boundary bulkheads of such spaces as machinery spaces, control stations and service spaces, and the protection of the above stairway enclosures and corridors shall be common to all three methods outlined in paragraph (1).

Cargo ships except tankers – bulkheads within accommodation area

56. (1) In a cargo ship, other than a tanker, bulkheads required to be “B” class divisions shall extend from deck to deck and to the shell or other boundaries. However, where a continuous “B” class ceiling or lining is fitted on both sides of the bulkhead, the bulkhead may terminate at the continuous ceiling or lining. One of the following methods of protection shall be adopted:

- (a) Method IC – Bulkheads not required by this or other Rules for cargo ships to be “A” or “B” class divisions shall be of at least “C” class construction;
- (b) Method IIC – There shall be no restriction on the construction of bulkheads not required by this or other Rules for cargo ships to be “A” or “B” class divisions except in individual cases where “C” class bulkheads are required in accordance with Table 1 to Rule 57;
- (c) Method IIIC – There shall be no restriction on the construction of bulkheads not required for cargo ships to be “A” or “B” class divisions except that the area of any accommodation space or spaces bounded by a continuous “A” or “B” class division must in no case exceed 50 m², except in individual cases where “C” class bulkheads are required in accordance with Table 1 to Rule 57.

Cargo ships except tankers – fire integrity of bulkheads and decks

57. (1) In a cargo ship, other than a tanker, in addition to complying with the specific provisions for fire integrity of bulkheads and decks of cargo ships,

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) (i) 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 (11) below. 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, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements;
 - (ii) smaller, enclosed rooms within a space that have less than 30 per cent communicating openings to that space are considered separate spaces. The fire integrity of the boundary bulkheads and decks of such smaller rooms shall be as prescribed in Tables 1 and 2. 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, including:
 - spaces containing emergency sources of power and lighting;
 - wheelhouse and chartroom;
 - spaces containing the ship's radio equipment;
 - fire control stations;
 - control room for propulsion machinery when located outside the machinery space;
 - spaces containing centralised fire alarm equipment.
 - (2) Corridors and lobbies.
 - (3) Accommodation spaces, excluding corridors.
 - (4) Stairways, including:
 - interior stairway, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto. In this connection, 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 (low risk), including lockers and store-rooms not having provisions for the storage of

flammable liquids and having areas less than 4 m² and drying rooms and laundries.

- (6) Machinery spaces of category A.
- (7) Other machinery spaces, including:
 - electrical equipment rooms, auto-telephone exchange and air-conditioning duct spaces;
 - machinery spaces, excluding machinery spaces of category A.
- (8) Cargo spaces, including all spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces.
- (9) Service spaces (high risk), including:
 - galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms 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.
- (10) Open decks, including:
 - open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;
 - air spaces, being the space outside superstructures and deckhouses.
- (11) Ro-ro spaces and vehicle spaces.

(3) 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.

(4) External boundaries that are required in Rule 108 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries of cargo ships to have “A” class integrity. Similarly, in such boundaries that are not required to have “A” class integrity, doors may be constructed of alternative materials where no reduction of safety occurs, to the satisfaction of the Minister.

(5) A sauna shall comply with Rule 50.

TABLE 1
Fire integrity of bulkheads separating adjacent spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Control stations (1)	A-0 ^c	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*	A-60
Corridors (2)		C	B-0	B-0 A-0 ^c	B-0	A-60	A-0	A-0	A-0	*	A-30
Accommodation spaces (3)			C ^{a,b}	B-0 A-0 ^c	B-0	A-60	A-0	A-0	A-0	*	A-30
Stairways (4)				B-0 A-0 ^c	B-0 A-0 ^c	A-60	A-0	A-0	A-0	* *	A-30
Service spaces (low risk) (5)					C	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A (6)						*	A-0	A-0 ^g	A-60	*	A-60 ^f
Other machinery spaces (7)							A-0 ^d	A-0	A-0	*	A-0
Cargo spaces (8)								*	A-0	*	A-0
Service spaces (high risk) (9)									A-0 ^d	*	A-30
Open decks (10)										-	A-0
Ro-ro and vehicle spaces (11)											* h

See Notes following Table 2 to this Rule.

TABLE 2
Fire integrity of decks separating adjacent spaces

Space below↓	Space 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 (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	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces (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 and vehicle spaces	(11)	A-60	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* ^h

Notes: To be applied to Tables 1 and 2 to Rule 57, as appropriate:

- a No special requirements are imposed upon bulkheads in Methods IIC and IIIC fire protection.
- b In the case of Method IIIC, “B” class bulkheads of “B-0” rating shall be provided between spaces or groups of spaces of 50 m² and greater in area.
- c For clarification as to which requirement applies, see Rules 56 and 58.
- 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 (for example in category (9)). 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 room from each other may have a “B-0” rating.
- f An “A-0” rating may be used if no dangerous goods are intended to be carried or if such goods are stowed not less than 3 m horizontally from such a bulkhead.
- g For cargo spaces in which dangerous goods are intended to be carried, Rule 152 applies.
- h Bulkheads and decks separating ro-ro spaces shall be capable of being closed reasonably gastight and such divisions shall have “A” class integrity in so far as reasonable and practicable, if in the opinion of the Minister it has little or no fire risk.
- i Fire insulation is not required to be fitted in the machinery space in category (7) if, in the opinion of the Minister, it has little or no fire risk.

* 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 of “A” class standard. However, where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-fighting system is fitted.

Cargo ships except tankers – protection of stairways and lift trunks in accommodation spaces, service spaces and control stations

58. (1) In a cargo ship, other than a tanker, stairways that penetrate only a single deck shall be protected, at a minimum, at one level by at least “B-0” class divisions and self-closing doors. Lifts that penetrate only a single deck shall be surrounded by “A-0” class divisions with steel doors at both levels. Stairways and lift trunks that penetrate more than a single deck shall be surrounded by at least “A-0” class divisions and be protected by self-closing doors at all levels.

(2) On a cargo ship, other than a tanker, having accommodation for 12 persons or less, where stairways penetrate more than a single deck and where there are at least two escape routes direct to the open deck at every accommodation level, the “A-0” requirements of paragraph (1) may be reduced to “B-0”.

Tankers – method of protection in accommodation area

59. In a tanker, the method of protection in accommodation and service spaces and control stations shall be in accordance with Method IC in Rule 55(1)(a).

Tankers – fire integrity of bulkheads and decks

60. (1) In a tanker, in addition to complying with the specific provisions for the fire integrity of bulkheads and decks of tankers, 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 bulkhead and decks separating adjacent spaces;
- (b) (i) 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. 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, or where it is possible to assign two or more classifications to a space, it shall be treated as a space within the relevant category having the most stringent boundary requirements;
- (ii) smaller, enclosed areas within a space that have less than 30 per cent communicating openings to that space are considered separate areas. The fire integrity of the boundary bulkheads and decks of such smaller spaces shall be as prescribed in Tables 1 and 2. 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, including:

spaces containing emergency sources of power and lighting;

wheelhouse and chartroom;

spaces containing the ship's radio equipment;

fire control stations;

control room for propulsion machinery when located outside the machinery space;

spaces containing centralised fire alarm equipment.

- (2) Corridors and lobbies.
- (3) Accommodation spaces, excluding corridors.
- (4) Stairways, including:
 - interior stairways, lifts, totally enclosed emergency escape trunks, and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto. In this connection, 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.
- (5) Service spaces (low risk), including lockers and store-rooms not having provisions for the storage of flammable liquids and having areas less than 4 m² and drying rooms and laundries.
- (6) Machinery spaces of category A.
- (7) Other machinery spaces, including:
 - electrical equipment rooms, auto-telephone exchange and air-conditioning duct spaces;
 - machinery spaces, excluding machinery spaces of category A.
- (8) Cargo pump-rooms, including spaces containing cargo pumps and entrances and trunks to such spaces.
- (9) Service spaces (high risk), including galleys, pantries containing cooking appliances, saunas, paint lockers and store-rooms 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.
- (10) Open decks, including:
 - open deck spaces and enclosed promenades having little or no fire risk. To be considered in this category, enclosed promenades shall have no significant fire risk, meaning that furnishings shall be restricted to

deck furniture. In addition, such spaces shall be naturally ventilated by permanent openings;

air spaces, being the space outside superstructures and deckhouses.

(3) 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.

(4) External boundaries, which are required in Rule 108 to be of steel or other equivalent material, may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries of tankers to have "A" class integrity. Similarly, in such boundaries that are not required to have "A" class integrity, doors may be constructed of alternative materials where no reduction of safety occurs, to the satisfaction of the Minister.

(5) Exterior boundaries of superstructures and deckhouses enclosing accommodation and 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 outward sides for a distance of 3 m from the end boundary facing the cargo area. The distance of 3 m shall be measured horizontally and parallel to the middle line of the ship from the boundary that faces the cargo area at each deck level. In the case of the sides of those superstructures and deckhouses, such insulation shall be carried up to the underside of the deck of the navigation bridge.

(6) Skylights to cargo pump-rooms shall be of steel, shall not contain any glass and shall be capable of being closed from outside the pump-room.

(7) The construction and arrangement of a sauna shall comply with Rule 50.

TABLE 1
Fire integrity of bulkheads separating adjacent spaces

Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control stations (1)	A-0 ^c	A-0	A-60	A-0	A-15	A-60	A-15	A-60	A-60	*
Corridors (2)		C	B-0	B-0 A-0 ^a	B-0	A-60	A-0	A-60	A-0	*
Accommodation spaces (3)			C	B-0 A-0 ^a	B-0	A-60	A-0	A-60	A-0	*
Stairways (4)				B-0 A-0 ^a	B-0 A-0 ^a	A-60	A-0	A-60	A-0	*
Service spaces (low risk) (5)					C	A-60	A-0	A-60	A-0	*
Machinery spaces of category A (6)						*	A-0	A-0 ^d	A-60	*
Other machinery spaces (7)							A-0 ^b	A-0	A-0	*
Cargo pump-rooms (8)								*	A-60	*
Service spaces (high risk) (9)									A-0 ^b	*
Open decks (10)										-

See Notes following Table 2 to this Rule.

TABLE 2
Fire integrity of decks separating adjacent spaces

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

Notes: To be applied to Tables 1 and 2 to Rule 60 as appropriate.

- a For clarification as to which applies, see Rules 56 and 58.
- 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, such as in category (9). 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 have a “B-0” rating.

d Bulkheads and decks between cargo pump-rooms and machinery spaces of category A may be penetrated by cargo pump shaft glands and similar gland penetrations, provided that gastight seals with efficient lubrication or other means of ensuring the permanence of the gas seal are fitted in way of the bulkheads or deck.

e Fire insulation is not required to be fitted in the machinery space in category (7) if, in the opinion of the Minister, it has little or no fire risk.

* Where an asterisk appears in the Table, the division is required to be of steel or other equivalent material but is not required to be of “A” class standard. However, where a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations shall be made tight to prevent the passage of flame and smoke. Divisions between control stations (emergency generators) and open decks may have air intake openings without means for closure, unless a fixed gas fire-fighting system is fitted.

Penetrations in fire-resisting divisions and prevention of heat transmission

61. (1) Where “A” class divisions are penetrated, such penetrations shall be tested in accordance with the Fire Test Procedures Code, subject to Rule 62(3). In the case of ventilation ducts, Rules 68(2) and 70(1) apply. However, where a pipe penetration is made of steel or equivalent material having a thickness of 3 mm or greater and a length of not less than 900 mm (preferably 450 mm on each side of the division), and no openings, testing is not required. Such penetrations shall be suitably insulated by extension of the insulation at the same level of the division.

(2) Where “B” class divisions are penetrated for the passage of electric cables, pipes, trunks and ducts or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to ensure that the fire resistance is not impaired, subject to Rule 70(2). Pipes, other than steel or copper pipes, that penetrate “B” class divisions shall be protected by either:

- (a) a fire tested penetration device suitable for the fire resistance of the division pierced and the type of pipe used; or
- (b) a steel sleeve having a thickness of not less than 1.8 mm and a length of not less than 900 mm for pipe diameters of 150 mm or greater, and not less than 600 mm for pipe diameters of less than 150 mm (preferably equally divided to each side of the division). The pipe shall be connected to the ends of the sleeve by flanges or couplings; or the clearance between the sleeve and the pipe shall not exceed 2.5 mm; or any clearance between pipe and sleeve shall be made tight by means of non-combustible or other suitable material.

(3) Uninsulated metallic pipes penetrating “A” or “B” class divisions shall be of materials having a melting temperature that exceeds 950°C for “A-0” and 850°C for “B-0” class divisions.

(4) In approving structural fire protection details, the Minister shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers. The insulation of a deck or bulkhead shall be carried past the penetration, intersection or terminal point for a distance of at least 450 mm in the case of steel and aluminium structures. If a space is divided with a deck or a bulkhead of “A” class standard having insulation of different values, the insulation with the higher value shall continue on the deck or bulkhead with the insulation of the lesser value for a distance of at least 450 mm.

Protection of openings in bulkheads and decks in passenger ships – openings in “A” class divisions

62. (1) In a passenger ship:

- (a) except in the case of hatches between cargo, special category, store, and baggage spaces, and between such spaces and the weather decks, openings shall be provided with permanently

attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted;

- (b) the construction of doors and door frames in “A” class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame equivalent to that of the bulkheads in which the doors are situated, this being determined in accordance with the Fire Test Procedures Code. Such doors and door frames shall be constructed of steel or other equivalent material. Doors approved without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 12 mm. A non-combustible sill shall be installed under the door such that floor coverings do not extend beneath the closed door;
- (c) watertight doors are not required to be insulated;
- (d) it shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.

(2) In a passenger ship, 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:

- (a) the doors shall be self-closing and be capable of closing with an angle of inclination of up to 3.5° opposing closure;
- (b) the approximate time of closure for hinged fire doors shall be no more than 40 seconds and no less than 10 seconds from the beginning of their movement with the ship in upright position. The approximate uniform rate of closure for sliding doors shall be of no more than 0.2 m/s and no less than 0.1 m/s with the ship in upright position;
- (c) the doors, except those for emergency escape trunks, 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;
- (d) hold-back hooks not subject to central control station release shall be prohibited;
- (e) a door closed remotely from the central control station shall be capable of being re-opened from both sides of the door by local control. After such local opening, the door shall automatically close again;
- (f) indication shall be provided at the fire door indicator panel in the continuously manned central control station whether each door is closed;
- (g) 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;

- (h) 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) after disruption of the control system or central power supply using the local controls;
- (i) disruption of the control system or central power supply at one door shall not impair the safe functioning of the other doors;
- (j) remote-released sliding or power-operated doors shall be equipped with an alarm that begins to sound at least 5 seconds but no more than 10 seconds after the door is released from the central control station and before the door begins to move, and continues to sound until the door is completely closed;
- (k) 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;
- (l) double-leaf doors equipped with a latch necessary for their fire integrity shall have a latch that is automatically activated by the operation of the doors when released by the fire door control system;
- (m) doors giving direct access to special category spaces that are power-operated and automatically closed are not required to be equipped with the alarms and remote-release mechanisms required in subparagraphs (c) and (j);
- (n) the components of the local control system shall be accessible for maintenance and adjusting;
- (o) power-operated doors shall be provided with a control system of an approved type which shall be able to operate in case of fire and be in accordance with the Fire Test Procedures Code. The control system shall satisfy the following requirements:
 - (i) the system shall be able to operate the door at a 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; and
 - (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.

(3) In a passenger ship carrying not more than 36 passengers, where a space is protected by an automatic sprinkler fire detection and alarm system complying with the provisions the Fire Safety Systems Code or fitted with a continuous “B” class ceiling, openings in decks not forming steps in main vertical zones nor 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.

(4) The requirements for “A” class integrity of the outer boundaries of a passenger ship shall not apply to glass partitions, windows and sidescuttles, provided that there is no requirement for such boundaries to have “A” class integrity in accordance with Rule 64(3). 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 lifesaving appliances, embarkation and external assembly station areas, external stairs and open decks used for escape routes. Stairway enclosure doors are not required to meet this requirement.

(5) In a passenger ship, except for watertight doors, weathertight doors (semi-watertight doors), doors leading to the open deck and doors that need to be reasonably gastight, 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. The material, construction and fire resistance of the hose port shall be 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.

(6) In a passenger ship, where it is necessary that a ventilation duct passes through a main vertical zone division, a fail-safe automatic closing fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The operating position shall be readily accessible and shall be marked in red light-reflecting colour. The duct between the division and the damper shall be of steel or other equivalent material and, if necessary, insulated to comply with the requirements of Rule 61(1). The damper shall be fitted on at least one side of the division with a visible indicator showing whether the damper is in the open position.

Protection of openings in bulkheads and decks in passenger ships – openings in “B” class divisions

63. (1) In a passenger ship:

- (a) 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, this being determined in accordance with the Fire Test Procedures Code 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. Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit, is permitted where the cross-sectional area of the duct does not exceed 0.05 m². All ventilation openings shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible. Doors approved without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 25 mm;

- (b) cabin doors in “B” class divisions shall be of a self-closing type. Hold-back hooks are not permitted;
- (c) the requirements for “B” class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for “B” class integrity shall not apply to exterior doors in superstructures and deckhouses. In a ship carrying not more than 36 passengers, the Minister may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

(2) In a passenger ship carrying not more than 36 passengers, where an automatic sprinkler system complying with the provisions of the Fire Safety Systems Code is fitted, the following requirements shall apply:

- (a) openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the “B” class integrity requirements in so far as is reasonable and practicable in the opinion of the Minister; and
- (b) openings in corridor bulkheads of “B” class materials shall be protected in accordance with Rule 48.

Protection of openings in bulkheads and decks in passenger ships – windows and sidescuttles

64. (1) Windows and sidescuttles in bulkheads within accommodation and service spaces and control stations, other than those to which the provisions of Rules 62(3) and 63(1)(c) apply, shall be so constructed as to preserve the integrity requirements of the type of bulkheads in which they are fitted, this being determined in accordance with the Fire Test Procedures Code.

(2) Notwithstanding the requirements of Tables 1 and 2 to Rule 49 and Tables 1 and 2 to Rule 51, 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.

(3) Subject to paragraph (4), windows facing life-saving appliances, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below liferaft and escape slide embarkation areas shall have fire integrity in accordance with the requirements in Table 1 to Rule 49. Where automatic dedicated sprinkler heads are provided for windows, “A-0” windows may be accepted as equivalent. To be considered under this paragraph, the sprinkler heads shall be either:

- (a) dedicated heads located above the windows, and installed in addition to the conventional ceiling sprinklers; or
- (b) conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5

litres/min/m² and the additional window area is included in the calculation of the area of coverage; or

- (c) in the case of a ship constructed on or after 1 July 2010, water-mist nozzles that have been tested and approved in accordance with the IMO “Revised Guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12” in IMO Resolution A.800(19) in its updated version.

Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to “A-0” class.

(4) Notwithstanding the requirements in paragraph (3), the following requirements shall apply to a passenger ship constructed on or after 1 January 2020:

- (a) in a ship carrying more than 36 passengers, windows facing survival craft, embarkation and assembly stations, external stairs and open decks used for escape routes, and windows situated below life raft and escape slide embarkation areas shall have fire integrity in accordance with Table 1 to Rule 49. Where automatic dedicated sprinkler heads are provided for windows, “A-0” windows may be accepted as equivalent. To be considered under this subparagraph, the sprinkler heads must either be:
 - (i) dedicated heads located above the windows and installed in addition to the conventional ceiling sprinklers; or
 - (ii) conventional ceiling sprinkler heads arranged such that the window is protected by an average application rate of at least 5 litres/min/m² and the additional window area is included in the calculation of the area of coverage; or
 - (iii) water-mist nozzles that have been tested and approved in accordance with the IMO “Revised Guidelines for approval of sprinkler systems equivalent to that referred to in SOLAS regulation II-2/12” in IMO Resolution A.800(19) in its updated version.

Windows located in the ship's side below the lifeboat embarkation area shall have fire integrity at least equal to “A-0” class;

- (b) in a ship carrying not more than 36 passengers, windows facing survival craft and escape slide, embarkation areas and windows situated below such areas shall have fire integrity at least equal to “A-0” class.

Doors in fire-resisting divisions in cargo ships

65. (1) In a cargo ship, the fire resistance of doors shall be equivalent to that of the division in which they are fitted, this being determined in accordance with the Fire Test Procedures Code. Doors approved as “A” class without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 12 mm and a non-combustible sill shall be installed under the door such that floor coverings do not

extend beneath the closed door. Doors approved as “B” class without the sill being part of the frame, which are installed on or after 1 July 2010, shall be installed such that the gap under the door does not exceed 25 mm. Doors and door frames in “A” class divisions shall be constructed of steel. Doors in “B” class divisions shall be non-combustible. Doors fitted in boundary bulkheads of machinery spaces of category A shall be reasonably gastight and self-closing. In a cargo ship constructed according to Method IC, the Minister may permit the use of combustible materials in doors separating cabins from individual interior sanitary accommodation such as showers.

(2) In a cargo ship, doors required to be self-closing shall not be fitted with hold-back hooks. However, hold-back arrangements fitted with remote release devices of the fail-safe type may be utilized.

(3) In corridor bulkheads in a cargo ship, ventilation openings may be permitted in and under the doors of cabins and public spaces. Ventilation openings are also permitted in “B” class doors leading to lavatories, offices, pantries, lockers and store-rooms. Except as permitted in the alternative below, the openings shall be provided only in the lower half of a door. Where such an opening is in or under a door, the total net area of any such opening or openings shall not exceed 0.05 m². Alternatively, a non-combustible air balance duct routed between the cabin and the corridor, and located below the sanitary unit, is permitted where the cross-sectional area of the duct does not exceed 0.05 m². Ventilation openings, except those under the door, shall be fitted with a grille made of non-combustible material.

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

Protection of openings in machinery space boundaries

66. (1) The provisions of this Rule shall apply to machinery spaces of category A, except that paragraph (7)(a) shall apply to other machinery spaces.

(2) The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.

(3) Skylights shall be constructed of steel and shall not contain glass panels.

(4) Means of control shall be provided for closing power-operated doors or actuating release mechanisms on doors other than power-operated watertight doors. The controls shall be located outside the space concerned, where they will not be cut off in the event of fire in the space they serve.

(5) In a passenger ship, the means of control required in paragraph (4) shall be situated at one control position or grouped in as few positions as possible to the satisfaction of the Minister. Such positions shall have safe access from the open deck.

(6) In a passenger ship, doors other than power-operated watertight doors shall be so arranged that positive closure is assured, in case of fire in the space, by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3.5° opposing closure, and

having a fail-safe hold-back arrangement, provided with a remotely operated release device. Doors for emergency escape trunks are not required to be fitted with a fail-safe hold-back facility and a remotely operated release device.

- (7) (a) Windows shall not be fitted in machinery space boundaries.
- (b) Paragraph (a) does not preclude the use of glass in control rooms within the machinery spaces.

Protection of cargo space boundaries

67. (1)(a) In a passenger ship carrying more than 36 passengers, the boundary bulkheads and decks of special category and ro-ro spaces shall be insulated to “A-60” class standard.
- (b) Where a category (5), (9) and (10) space, as defined in Rule 49, is on one side of the division, the standard of insulation in subparagraph (a) may be reduced to “A-0” class standard.
 - (c) Where fuel oil tanks are below a special category space, the integrity of the deck between such spaces may be reduced to “A-0” class standard.

- (2) In a passenger ship carrying not more than 36 passengers:

- (a) the boundary bulkheads of special category spaces shall be insulated in accordance with the requirements for category (11) spaces in Table 1 to Rule 51;
- (b) the horizontal boundaries of special category spaces shall be insulated in accordance with the requirements for category (11) spaces in Table 2 to Rule 51;
- (c) the boundary bulkheads and decks of closed and open ro-ro spaces shall have a fire integrity in accordance with the requirements for category (8) spaces in Table 1 to Rule 51;
- (d) the horizontal boundaries of closed and open ro-ro spaces shall have a fire integrity in accordance with the requirements for category (8) spaces in Table 2 to Rule 51.

(3) In a passenger ship, indicators shall be provided on the navigating bridge which shall indicate when any fire door leading to or from the special category spaces is closed.

(4) In a tanker, 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.

Ventilation systems – ducts and dampers

68. (1)(a) (i) Subject to subparagraph (b), ventilation ducts shall be of steel or equivalent.

- (ii) In a ship constructed on or after 1 January 2016, ventilation ducts, including single and double wall ducts, shall be of steel or equivalent material except flexible bellows of short length not exceeding 600 mm used for connecting fans to the ducting in air conditioning rooms. Unless expressly provided otherwise in paragraph (6), any other material used in the construction of ducts, including insulation, shall be non-combustible.
- (b) Short ducts, not generally exceeding 2 m in length and with a free cross-sectional area not exceeding 0.02 m², are not required to be of steel or equivalent, subject to the following conditions:
 - (i) subject to article (ii), the ducts shall be made of any material which has low flame spread characteristics;
 - (ii) on a ship constructed on or after 1 July 2010, the ducts shall be made of heat resisting non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value not exceeding 45 MJ/m² of their surface area for the thickness used;
 - (iii) the ducts are only used at the end of the ventilation device; and
 - (iv) the ducts are not situated less than 600 mm, measured along the duct, from an opening in an "A" or "B" class division, including a continuous "B" class ceiling.
- (c) In this paragraph the term "free cross-sectional area" means, even in the case of a pre-insulated duct, the area calculated on the basis of the inner diameter of the duct itself and not the insulation.

(2) The following arrangements shall be tested in accordance with the Fire Test Procedures Code:

- (a) fire dampers, including their relevant means of operation. The testing is not required for dampers located at the lower end of the duct in exhaust ducts for galley ranges, which are required to be of steel and be capable of stopping the draught in the duct; and
- (b) (i) subject to subparagraph (ii), duct penetrations through "A" class divisions;
- (ii) the test at subparagraph (i) is not required where steel sleeves are directly joined to ventilation ducts by means of riveted or screwed connections or by welding.

(3) Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, the ceilings or linings shall be provided with an inspection hatch on which the identification number of the fire damper is marked. The fire damper identification number shall also be marked on any remote controls that are provided.

(4) Ventilation ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

(5) The main inlets and outlets of ventilation systems shall be capable of being closed from outside the spaces being ventilated. The means of closing shall be easily accessible as well as prominently and permanently marked and shall indicate the operating position of the closing device.

(6) Combustible gaskets in flanged ventilation duct connections shall not be permitted within 600 mm of openings in “A” or “B” class divisions and in ducts required to be of “A” class construction.

(7) Ventilation openings or air balance ducts between two enclosed spaces shall not be provided except as permitted by Rule 63(1)(a) and Rule 64(3).

Ventilation systems – arrangement of ducts

69. (1) The ventilation systems for machinery spaces of category A, vehicle spaces, ro-ro spaces, galleys, special category spaces and cargo spaces shall, in general, be separated from each other and from the ventilation systems serving other spaces, except that the galley ventilation systems on cargo ships of less than 4,000 gross tonnage and in passenger ships carrying not more than 36 passengers, are not required to be completely separated from other ventilation systems, but may be served by separate ducts from a ventilation unit serving other spaces. In such a case, an automatic fire damper shall be fitted in the galley ventilation duct near the ventilation unit.

(2) In a ship constructed before 1 January 2016, ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces shall not pass through accommodation spaces, service spaces or control stations unless they comply with the conditions specified in subparagraphs (a) to (d) or subparagraphs (e) and (f) below:

- (a) the ducts are 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 obtained by interpolation;
 - (b) the ducts are suitably supported and stiffened;
 - (c) the ducts are fitted with automatic fire dampers close to the boundaries penetrated; and
 - (d) the ducts are insulated to “A-60” class standard from the machinery spaces, galleys, vehicle spaces, ro-ro spaces or special category spaces to a point at least 5 m beyond each fire damper;
- or
- (e) the ducts are constructed of steel in accordance with subparagraphs (a) and (b); and
 - (f) the ducts are insulated to “A-60” class standard throughout the accommodation spaces, service spaces or control stations;

except that penetrations of main zone divisions shall also comply with the requirements of Rule 62(5).

(3) In a ship constructed before 1 January 2016, ducts provided for ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces unless they comply with the conditions specified in subparagraphs (a) to (c) or (d) and (e) below:

- (a) the ducts, where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space, are constructed of steel in accordance with paragraphs (2)(a) and (b);
 - (b) automatic fire dampers are fitted close to the boundaries penetrated; and
 - (c) the integrity of the machinery space, galley, vehicle space, ro-ro space or special category space boundaries is maintained at the penetrations;
- or
- (d) the ducts, where they pass through a machinery space of category A, galley, vehicle space, ro-ro space or special category space, are constructed of steel in accordance with paragraphs (2)(a) and (b); and
 - (e) the ducts are insulated to “A-60” standard within the machinery space, galley, vehicle space, ro-ro space or special category space;

except that penetrations of main zone divisions shall also comply with the requirements of Rule 62(5).

(4) In a ship constructed on or after 1 January 2016, ducts provided for the ventilation of machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces shall not pass through accommodation spaces, service spaces, or control stations unless they comply with paragraph (6).

(5) In a ship constructed on or after 1 January 2016, ducts provided for the ventilation of accommodation spaces, service spaces or control stations shall not pass through machinery spaces of category A, galleys, vehicle spaces, ro-ro spaces or special category spaces unless they comply with paragraph (6).

(6) The ducts provided in accordance with paragraphs (4) and (5) shall be either:

- (a) constructed of steel having a thickness of at least 3 mm for ducts with a free cross-sectional area of less than 0.075 m², at least 4 mm for ducts with a free cross-sectional area of between 0.075 m² and 0.45 m², and at least 5 mm for ducts with a free cross-sectional area greater than 0.45 m²;
 - (b) suitably supported and stiffened;
 - (c) fitted with automatic fire dampers close to the boundaries penetrated; and
 - (d) insulated to “A-60” class standard from the boundaries of the spaces they serve to a point at least 5 m beyond each fire damper;
- or

- (e) constructed of steel in accordance with subparagraphs (a) and (b); and
- (f) insulated to “A-60” class standard throughout the spaces they pass through, except for ducts that pass through spaces of category (9) or (10) as described in Rule 49(2).

(7) For the purpose of paragraph (6)(d) and (f), ducts shall be insulated over their entire cross-sectional external surface. Ducts that are outside but adjacent to the specified space, and share one or more surfaces with it, shall be considered to pass through the specified space, and shall be insulated over the surface they share with the space for a distance of 450 mm past the duct.

(8) Where it is necessary that a ventilation duct passes through a main vertical zone division, an automatic fire damper shall be fitted adjacent to the division. The damper shall also be capable of being manually closed from each side of the division. The control location shall be readily accessible and be clearly and prominently marked. The duct between the division and the damper shall be constructed of steel in accordance with paragraphs (6)(a) and (b) and insulated to at least the same fire integrity as the division penetrated. The damper shall be fitted on at least one side of the division with a visible indicator showing the operating position of the damper.

Ventilation systems – details of fire dampers and duct penetrations

70. (1) In a ship constructed on or after 1 July 2002 and before 1 January 2016:

- (a) where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m² passes through “A” class bulkheads or decks, the opening shall be lined with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of the bulkhead or, in the case of the deck, wholly laid on the lower side of the decks pierced. Where ventilation ducts with a free cross-sectional area exceeding 0.02 m² pass through “A” class bulkheads or decks, the opening shall be lined with a steel sheet sleeve. Where such ducts are of steel construction and pass through a deck or bulkhead, the ducts and sleeves shall comply with the following:
 - (i) the sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes; and
 - (ii) ducts with a free cross-sectional area exceeding 0.075 m² shall be fitted with fire dampers in addition to the requirements of clause (i). The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the bulkhead or deck. The

damper shall be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required where ducts pass through spaces surrounded by "A" class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they pierce. Fire dampers shall be easily accessible. Where they are placed behind ceilings or linings, these ceilings or linings shall be provided with an inspection door on which a plate reporting the identification number of the fire damper is provided. The fire damper identification number shall also be placed on any remote controls required;

- (b) ventilation ducts with a free cross-sectional area exceeding 0.02 m² passing through "B" class bulkheads shall be lined with steel sheet sleeves of 900 mm in length, divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length.

(2) In a ship constructed on or after 1 January 2016:

- (a) ducts passing through "A" class divisions shall meet the following requirements:
 - (i) where a thin plated duct with a free cross-sectional area equal to, or less than, 0.02 m² passes through "A" class divisions, the opening shall be fitted with a steel sheet sleeve having a thickness of at least 3 mm and a length of at least 200 mm, divided preferably into 100 mm on each side of a bulkhead or, in the case of a deck, wholly laid on the lower side of the decks penetrated;
 - (ii) where ventilation ducts with a free cross-sectional area exceeding 0.02 m², but not greater than 0.075 m², pass through "A" class divisions, the openings shall be lined with steel sheet sleeves. The ducts and sleeves shall have a thickness of at least 3 mm and a length of at least 900 mm. When passing through bulkheads, this length shall be divided preferably into 450 mm on each side of the bulkhead. These ducts, or sleeves lining such ducts, shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes; and
 - (iii) automatic fire dampers shall be fitted in all ducts with a free cross-sectional area exceeding 0.075 m² that pass through "A" class divisions. Each damper shall be fitted close to the division penetrated and the duct between the damper and the division penetrated shall be constructed of steel in accordance with Rule 69(6)(a) and (b). The fire damper shall operate automatically, but shall also be capable of being closed manually from both sides of the division. The damper shall be fitted with a visible indicator which shows

the operating position of the damper. Fire dampers are not required where ducts pass through spaces surrounded by “A” class divisions, without serving those spaces, provided those ducts have the same fire integrity as the divisions which they penetrate. A duct of cross-sectional area exceeding 0.075m² shall not be divided into smaller ducts at the penetration of an “A” class division and then recombined into the original duct once through the division to avoid installing the damper required by this provision;

- (b) ventilation ducts with a free cross-sectional area exceeding 0.02 m² passing through “B” class bulkheads shall be lined with steel sheet sleeves of 900 mm in length, divided preferably into 450 mm on each side of the bulkheads unless the duct is of steel for this length;
- (c) all fire dampers shall be capable of manual operation. The dampers shall have a direct mechanical means of release or, alternatively, be closed by electrical, hydraulic or pneumatic operation. All dampers shall be manually operable from both sides of the division. Automatic fire dampers, including those capable of remote operation, shall have a failsafe mechanism that will close the damper in a fire even upon loss of electrical power or hydraulic or pneumatic pressure loss. Remotely operated fire dampers shall be capable of being reopened manually at the damper.

Ventilation systems for passenger ships carrying more than 36 passengers

71. (1) The ventilation system of a passenger ship carrying more than 36 passengers shall be in compliance with the additional requirements of this Rule.

(2) In general, the ventilation fans shall be so arranged that the ducts reaching the various spaces remain within a main vertical zone.

(3) Where a ventilation system penetrates decks, precautions shall be taken, in addition to those relating to the fire integrity of the deck required by Rules 61(1) and 62(3), to reduce the likelihood of smoke and hot gases passing from one 'tween-deck space to another through the system. In addition to the insulation requirements contained in this Rule, vertical ducts shall, if necessary, be insulated as required by the appropriate Tables 1 and 2 to Rule 49.

(4) Except in cargo spaces, ventilation ducts shall be constructed of the following materials:

- (a) ducts not less than 0.075 m² in free cross-sectional area and all vertical ducts serving more than a single 'tween-deck space shall be constructed of steel or other equivalent material;
- (b) ducts less than 0.075 m² in free cross-sectional area other than the vertical ducts referred to in subparagraph (a), shall be constructed of steel or equivalent materials. Where such ducts penetrate “A” or “B” class divisions, due regard shall be given to ensuring the fire integrity of the division; and

- (c) short lengths of duct, not in general exceeding 0.02 m² in free cross-sectional area nor 2 m in length, are not required to be steel or equivalent provided that all of the following conditions are met:
 - (i) subject to subparagraph (ii), the duct is constructed of any material which has low flame spread characteristics;
 - (ii) on a ship constructed on or after 1 July 2010, the ducts shall be made of heat resisting non-combustible material, which may be faced internally and externally with membranes having low flame-spread characteristics and, in each case, a calorific value not exceeding 45 MJ/m² of their surface area for the thickness used;
 - (iii) the duct is used only at the terminal end of the ventilation system; and
 - (iv) the duct is not located closer than 600 mm measured along its length to a penetration of an “A” or “B” class division, including continuous “B” class ceilings.

(5) Stairway enclosures shall be ventilated and served by an independent fan and duct system which shall not serve any other spaces in the ventilation systems.

(6) Exhaust ducts shall be provided with hatches for inspection and cleaning. The hatches shall be located near the fire dampers.

(7) In addition to the requirements in Rules 68, 69 and 70, the ventilation system of a passenger ship carrying more than 36 passengers constructed on or after 1 January 2016 shall meet the following requirements:

- (a) stairway enclosures shall be served by an independent ventilation fan and duct system (exhaust and supply) which shall not serve any other spaces in the ventilation systems;
- (b) a duct, irrespective of its cross-section, serving more than one 'tween-deck accommodation space, service space or control station, shall be fitted, near the penetration of each deck of such spaces, with an automatic smoke damper that shall also be capable of being closed manually from the protected deck above the damper. Where a fan serves more than one 'tween-deck space through separate ducts within a main vertical zone, each dedicated to a single 'tween-deck space, each duct shall be provided with a manually operated smoke damper fitted close to the fan;
- (c) vertical ducts shall, if necessary, be insulated as required by Tables 1 and 2 to Rule 49. Ducts shall be insulated as required for decks between the space they serve and the space being considered, as applicable.

Exhaust ducts from galley ranges – requirements for passenger ships carrying more than 36 passengers

72. (1) In a passenger ship carrying more than 36 passengers constructed before 1 January 2016, exhaust ducts from galley ranges shall be fitted with:

- (a) a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;
- (b) 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;
- (c) a fixed means for extinguishing a fire within the duct;
- (d) remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in subparagraph (b) 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, a remote means located with the above controls shall be provided to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and
- (e) suitably located hatches for inspection and cleaning.

(2) In a passenger ship carrying more than 36 passengers and constructed on or after 1 July 2010, exhaust ducts from ranges for cooking equipment installed on open decks shall conform with paragraph (1), as applicable, when passing through accommodation spaces or spaces containing combustible materials.

(3) In a passenger ship carrying more than 36 passengers and constructed on or after 1 January 2016, in addition to the requirements in Rules 68, 69 and 70, exhaust ducts from galley ranges shall be constructed in accordance with Rule 69(2)(e) and (f) or 69(6)(e) and (f) and shall be insulated to "A-60" class standard throughout accommodation spaces, service spaces or control stations they pass through. They shall also be fitted with:

- (a) a grease trap readily removable for cleaning unless an alternative approved grease removal system is fitted;
- (b) a fire damper located in the lower end of the duct at the junction between the duct and the galley range hood which is automatically and remotely operated and, in addition, a remotely operated fire damper located in the upper end of the duct close to the outlet of the duct;
- (c) a fixed means for extinguishing a fire within the duct, having regard to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and marine technology – Fire-extinguishing systems for protection of galley cooking equipment;
- (d) remote-control arrangements for shutting off the exhaust fans and supply fans, for operating the fire dampers mentioned in subparagraph (b) and for operating the fire-extinguishing system, which shall be placed in a position outside the galley close to the entrance to the galley. Where a multi-branch system is installed, a remote means located with the above controls shall be provided

to close all branches exhausting through the same main duct before an extinguishing medium is released into the system; and

- (e) suitably located hatches for inspection and cleaning, including one provided close to the exhaust fan and one fitted in the lower end where grease accumulates.

Exhaust ducts from galley ranges – requirements for cargo ships and passenger ships carrying not more than 36 passengers

73. (1) In a cargo ship and a passenger ship carrying not more than 36 passengers constructed before 1 January 2016, where the exhaust ducts from galley ranges pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of “A” class divisions. Each exhaust duct shall be fitted with:

- (a) a grease trap readily removable for cleaning;
- (b) a fire damper located in the lower end of the duct and, in addition, in the case of a ship constructed on or after 1 July 2010, a fire damper in the upper end of the duct;
- (c) arrangements, operable from within the galley, for shutting off the exhaust fans; and
- (d) fixed means for extinguishing a fire within the duct.

(2) In a cargo ship and a passenger ship carrying not more than 36 passengers constructed on or after 1 January 2016, where the exhaust ducts from galley ranges pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed in accordance with Rule 69(6)(a) and (b). Each exhaust duct shall be fitted with:

- (a) a grease trap readily removable for cleaning;
- (b) an automatically and remotely operated fire damper located in the lower end of the duct at the junction between the duct and the galley range hood and, in addition, a remotely operated fire damper in the upper end of the duct close to the outlet of the duct;
- (c) arrangements, operable from within the galley, for shutting off the exhaust fans; and
- (d) fixed means for extinguishing a fire within the duct, having regard to the recommendations published by the International Organization for Standardization, in particular publication ISO 15371:2009, Ships and marine technology – Fire-extinguishing systems for protection of galley cooking equipment.

Ventilation rooms serving machinery spaces of category A containing internal combustion machinery

74. In a ship constructed on or after 1 January 2016:

- (1) where a ventilation room serves an adjacent machinery space of category A containing internal combustion machinery only and there is

no fire division between the ventilation room and the machinery space, the means for closing the ventilation duct or ducts serving the machinery space shall be located outside of the ventilation room and machinery space;

(2) where a ventilation room serves a machinery space of category A containing internal combustion machinery as well as other spaces and is separated from the machinery space by an “A-0” class division, including penetrations, the means for closing the ventilation duct or ducts for the machinery space may be located in the ventilation room.

Ventilation systems for laundries in ships carrying more than 36 passengers

75. (1) In a passenger ship carrying more than 36 passengers and constructed on or after 1 July 2010, exhaust ducts from laundries shall be fitted with:

- (a) filters that are readily removable for cleaning purposes;
- (b) a fire damper located in the lower end of the duct which is automatically and remotely operated;
- (c) remote-control arrangements for shutting off the exhaust fans and supply fans from within the space and for operating the fire damper mentioned in subparagraph (b); and
- (d) suitably located hatches for inspection and cleaning.

(2) In a passenger ship carrying more than 36 passengers constructed on or after 1 January 2016, exhaust ducts from laundries and drying rooms of category (13) spaces as described in Rule 49(2)(b) shall comply with the requirements of paragraph (1).

Fire fighting – water supply systems

76. (1) The purpose of this Rule is to suppress and swiftly extinguish a fire in the space of origin on a ship, except in a case to which paragraph (2) applies. Ships shall be provided with fire pumps, fire mains, hydrants and hoses complying with the applicable requirements of Rules 77 to 107. Fixed fire-extinguishing systems shall be installed having due regard to the fire growth potential of the protected spaces and fire-extinguishing appliances shall be readily available.

(2) For open-top container holds and on-deck container stowage areas on ships designed to carry containers on or above the weather deck and constructed on or after 1 January 2016, fire protection arrangements shall be provided for the purpose of containing a fire in the space or area of origin and cooling adjacent areas to prevent fire spread and structural damage.

(3) In this Rule, “open-top container hold” means a cargo hold that is not fitted with a hatch cover.

Fire fighting – fire mains and hydrants

77. (1) Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. The arrangement of pipes and hydrants shall be such as to avoid the possibility of freezing. Suitable drainage provisions shall be provided for fire main piping. Isolation valves shall be installed for all open deck fire main branches used for purposes other than fire fighting.

(2) In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.

Fire fighting – ready availability of water supply

78. The arrangements for the ready availability of water supply shall be as follows:

(1) in a passenger ship -

- (a) of 1,000 gross tonnage and greater, such that at least one effective jet of water is immediately available from any hydrant in an interior location and so as to ensure the continuation of the output of water by the automatic starting of one required fire pump; or
- (b) of less than 1,000 gross tonnage, by automatic start of at least one fire pump or by remote starting from the navigation bridge of at least one fire pump. If the pump starts automatically or if the bottom valve cannot be opened from where the pump is remotely started, the bottom valve shall always be kept open;

(2) in a cargo ship with a periodically unattended machinery space or when only one person is required on watch, there shall be immediate water delivery from the fire main system at a suitable pressure, either by remote starting of one of the main fire pumps with remote starting from the navigating bridge and fire control station, if any, or permanent pressurization of the fire main system by one of the main fire pumps, except that the Minister may waive this requirement for a cargo ship of less than 1,600 gross tonnage if the fire pump starting arrangement in the machinery space is in an easily accessible position.

Fire fighting – diameter of fire mains

79. The diameter of the fire main and water service pipes shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously, except that in the case of a cargo ship, other than a cargo ship to which Rule 103(6)(b) applies, the diameter is only required to be sufficient for the discharge of 140 m³/h.

Fire fighting – isolating valves and relief valves

80. (1)(a) 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 an easily accessible and tenable position outside the machinery spaces.

- (b) 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 in subparagraph (a), can be supplied with water by another fire pump or an emergency fire pump.
- (c) The emergency fire pump, its seawater inlet, and suction and delivery pipes and isolating valves shall be located outside the machinery space. If this arrangement cannot be made, the sea-chest may be fitted in the machinery space if the valve is remotely controlled from a position in the same compartment as the emergency fire pump and the suction pipe is as short as practicable.
- (d) Short lengths of suction or discharge piping may penetrate the machinery space, provided they are enclosed in a substantial steel casing, or are insulated to "A-60" class standards. The pipes shall have substantial wall thickness, but in no case less than 11 mm, and shall be welded except for the flanged connection to the sea inlet valve.

(2) A valve shall be fitted to serve each fire hydrant so that any fire hose may be removed while the fire pumps are in operation.

(3) Relief valves shall be provided in conjunction with fire pumps if the pumps are capable of developing a pressure exceeding the design pressure of the water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.

(4) In a tanker, isolation valves shall be fitted in the fire main at the 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 fighting – number and position of hydrants

81. (1) The number and position of hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any part of any cargo space when empty, any ro-ro space or any vehicle space, in which latter case the two jets shall reach any part of the space, each from a single length of hose. Furthermore, such hydrants shall be positioned near the accesses to the protected spaces.

(2) In addition to the requirements of paragraph (1), a passenger ship shall comply with the following:

- (a) in the accommodation, service and machinery spaces, the number and position of hydrants shall be such that the requirements of paragraph (1) may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed; and

- (b) where access is provided to a machinery space of category A at a low level from an adjacent shaft tunnel, two hydrants shall be provided external to, but near the entrance to that machinery space. Where such access is provided from other spaces, in one of those spaces two hydrants shall be provided near the entrance to the machinery space of category A. Such provision is not required to be made where the tunnel or adjacent spaces are not part of the escape route.

Fire fighting – pressure at hydrants

82. With the two pumps simultaneously delivering water through the nozzles specified in Rule 90, with the quantity of water as specified in Rule 79 through any adjacent hydrants, the following minimum pressures shall be maintained at all hydrants:

- (1) in a passenger ship of
 - (a) 4,000 gross tonnage and greater 0.40 N/mm²,
 - (b) less than 4,000 gross tonnage 0.30 N/mm²;
- (2) in a cargo ship of
 - (a) 6,000 gross tonnage and greater 0.27 N/mm²,
 - (b) less than 6,000 gross tonnage 0.25 N/mm²; and
- (3) the maximum pressure at any hydrant shall not exceed that at which the effective control of a fire hose can be demonstrated.

Fire fighting – international shore connection

83. (1) Ships of 500 gross tonnage and greater shall be provided with at least one international shore connection complying with the Fire Safety Systems Code.

(2) Facilities shall be available enabling a connection provided in accordance with paragraph (1) to be used on either side of the ship.

Fire pumps – pumps accepted as fire pumps

84. Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps provided that they are not normally used for pumping oil and that, if they are subject to occasional duty for the transfer or pumping of oil fuel, suitable change-over arrangements are fitted.

Number of fire pumps

85. Ships shall be provided with independently driven fire pumps as follows:
- (1) in a passenger ship of:
 - (a) 4,000 gross tonnage and greater, at least 3 pumps,

- (b) less than 4,000 gross tonnage, at least 2 pumps;
- (2) in a cargo ship of:
 - (a) 1,000 gross tonnage and greater, at least 2 pumps,
 - (b) less than 1,000 gross tonnage, at least 2 power driven pumps, one of which shall be independently driven.

Arrangement of fire pumps and fire mains

86. The arrangement of sea connections, fire pumps and their sources of power shall be such as to ensure that –

- (1) in a passenger ship of 1,000 gross tonnage and greater, in the event of a fire in any one compartment, all the fire pumps shall not be put out of action; and
- (2) in a passenger ship of less than 1,000 gross tonnage and in a cargo ship, if a fire in any one compartment could put all the pumps out of action, there shall be an alternative means consisting of an emergency fire pump complying with the provisions of the Fire Safety Systems Code, with its source of power and sea connection located outside the space where the main fire pumps or their sources of power are located.

Requirements for the space containing the emergency fire pump

87. (1) 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 two spaces shall be insulated to a standard of structural fire protection equivalent to that required for a control station in Rule 57.

(2) No direct access shall be permitted between the machinery space and the space containing the emergency fire pump and its source of power. When this is impracticable, the Minister may accept an arrangement where the access is by means of an airlock with the door of the machinery space being of “A-60” class standard, and the other door being at least steel, both reasonably gastight, self-closing and without any hold-back arrangements. Alternatively, the access may be 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 such cases, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

(3) Ventilation arrangements to the space containing the independent source of power for the emergency fire pump shall be such as to preclude, as far as practicable, the possibility of smoke from a machinery space fire entering or being drawn into that space.

(4) In a cargo ship 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 Rules 82(2) and 88(2), is capable of providing water to the fire main.

Capacity of fire pumps

88. (1) For fire-fighting purposes, the required fire pumps shall be capable of delivering a quantity of water at the pressure specified in Rule 82 as follows:

- (a) in the case of pumps in a passenger ship, the quantity of water shall not be less than two thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping; and
- (b) in the case of pumps in a cargo ship, other than any emergency pump, the quantity of water shall not be less than four thirds of the quantity required under Safety Convention regulation II-1/21 or, in the case of a ship constructed on or after 1 January 2009, under Safety Convention regulation II-1/35-1, to be dealt with by each of the independent bilge pumps in a passenger ship of the same dimension when employed in bilge pumping, provided that in a cargo ship, other than a cargo ship to which Rule 103(6)(b) applies, the total required capacity of the fire pumps is not required to exceed 180 m³/h.

(2) Each of the required fire pumps (other than any emergency pump required in accordance with Rule 86(2) in a cargo ship) shall have a capacity not less than 80 per cent of the total required capacity divided by the minimum number of required fire pumps, but in any case not less than 25 m³/h, and each such pump shall in any event be capable of delivering at least the two required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions. Where additional pumps to the minimum of required pumps are installed, such additional pumps shall have a capacity of at least 25 m³/h and shall be capable of delivering at least the two jets of water required in accordance with Rule 81(1).

Fire hoses and nozzles

89. (1) Fire hoses shall be of non-perishable material approved by the Minister and shall be sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Each hose shall be provided with a nozzle and the necessary couplings.

(2) Hoses specified in these Rules as fire hoses shall, together with any necessary fittings and tools, be kept ready for use in conspicuous positions near the water service hydrants or connections. Additionally, in interior locations in passenger ships carrying more than 36 passengers, fire hoses shall be connected to the hydrants at all times.

(3) Fire hoses shall have a length of at least 10 m, but not more than:

- (a) 15 m in machinery spaces;
- (b) 20 m in other spaces and open decks; and
- (c) 25 m for open decks on ships with a maximum breadth in excess of 30 m.

(4) Unless one hose and nozzle is provided for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

(5) A ship shall be provided with fire hoses, the number of which shall satisfy the requirements of Rule 81(1) and the diameter of which shall be not less than 64 millimetres if unlined or 45 millimetres if lined, except that smaller diameter hoses may be permitted in ships of less than 1,000 gross tonnage subject to the satisfaction of the Minister.

(6) In a passenger ship, there shall be at least one fire hose for each of the hydrants required by Rule 81 and these hoses shall be used only for the purposes of extinguishing fires or testing the fire-extinguishing apparatus at fire drills and surveys.

(7) In a cargo ship:

- (a) of 1,000 gross tonnage and greater, the number of fire hoses to be provided shall be one for each 30 m length of the ship and one spare, but in no case less than 5 fire hoses in total. This number does not include any hoses required in any engine-room or boiler room. The Minister may increase the number of hoses required so as to ensure that hoses in sufficient number are available and accessible at all times, having regard to the type of ship and the nature of trade in which the ship is employed. A ship carrying dangerous goods in accordance with Rules 143 to 155 shall be provided with 3 hoses and 3 nozzles, in addition to those required in this subparagraph; and
- (b) of less than 1,000 gross tonnage, the number of fire hoses to be provided shall be calculated in accordance with the provisions of subparagraph (a) but shall in no case be less than 3 fire hoses.

Size and types of nozzles

90. (1) For the purpose of these Rules, standard nozzle sizes shall be 12 mm, 16 mm and 19 mm or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Minister.

(2) For accommodation and service spaces, a nozzle size greater than 12 mm is not required to be used.

(3) For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in Rule 82 from the smallest pump, provided that a nozzle size greater than 19 mm is not required to be used.

(4) Nozzles shall be of an approved dual-purpose type, that is a spray/jet type, incorporating a shutoff.

Portable fire extinguishers

91. (1) Portable fire extinguishers shall comply with the requirements of the Fire Safety Systems Code.

(2) Accommodation spaces, service spaces and control stations shall be provided with portable fire extinguishers of appropriate types and in sufficient number so that at least one such extinguisher will be readily available for use in any part of the accommodation spaces. Ships of 1,000 gross tonnage and greater shall carry at least 5 portable fire extinguishers.

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

(4) Carbon dioxide fire extinguishers shall not be placed in accommodation spaces. In control stations and other spaces containing electrical or electronic equipment or appliances necessary for the safety of the ship, fire extinguishers shall be provided whose extinguishing media are neither electrically conductive nor harmful to the equipment and appliances.

(5) Fire extinguishers shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of a fire, and in such a way that their serviceability is not impaired by the weather, vibration or other external factors. Portable fire extinguishers shall be provided with devices which indicate whether the extinguishers have been used.

(6) Spare charges shall be provided for 100 per cent of the first 10 extinguishers and 50 per cent of the remaining fire extinguishers capable of being recharged on board. Not more than 60 total spare charges are required. Instructions for recharging shall be carried on board a ship.

(7) For fire extinguishers that cannot be recharged on board a ship, additional portable fire extinguishers of the same quantity, type, capacity and number as determined in paragraph (5) shall be provided in lieu of spare charges.

Fixed fire-extinguishing systems

92. (1) A fixed fire-extinguishing system required by Rule 96 may be any of the following systems:

- (a) a fixed gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code;
- (b) a fixed high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code;
or
- (c) a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

(2) Where a fixed fire-extinguishing system other than those required by these Rules is installed, it shall meet the requirements of the relevant applicable Rules and the Fire Safety Systems Code.

(3) Fire-extinguishing systems using Halon 1211, 1301, and 2402 and perfluorocarbons are prohibited.

(4) In general, the use of steam as a fire-extinguishing medium in fixed fire-extinguishing systems shall not be permitted. Where the use of steam is permitted, it shall be used only in restricted areas as an addition to the required

fire-extinguishing system and shall comply with the requirements of the Fire Safety Systems Code.

Closing appliances for fixed gas fire-extinguishing systems

93. Where a fixed gas fire-extinguishing system is used, openings which may admit air to or allow gas to escape from a protected space shall be capable of being closed from outside the protected space.

Storage rooms of fire-extinguishing medium

94. (1) When the fire-extinguishing medium is stored outside a protected space, it shall be stored in a room that is located behind the forward collision bulkhead, and is used for no other purposes. Any entrance to such a storage room shall preferably be from the open deck and shall be independent of the protected space.

(2) If the storage room referred to in paragraph (1) is located below deck, it shall be located no more than one deck below the open deck and shall be directly accessible by a stairway or ladder from the open deck. Storage rooms that are located below deck, or spaces where access from the open deck is not provided, shall be fitted with a mechanical ventilation system designed to take exhaust air from the bottom of the space and shall be sized to provide at least 6 air changes per hour.

(3) Access doors to storage rooms 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 adjacent enclosed spaces shall be gastight. For the purpose of the application of the Tables to Rules 49, 51, 57 and 60, such storage rooms shall be treated as fire control stations.

Water pumps for other fire-extinguishing systems

95. Pumps, other than those serving the fire main, required for the provision of water for 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 space or spaces protected will not put any such system out of action.

Fire extinguishing arrangements in machinery spaces containing oil-fired boilers or oil fuel units

96. (1) Machinery spaces of category A containing oil-fired boilers or oil fuel units shall be provided with a fixed fire-extinguishing system in accordance with Rule 92. In each case, if the engine-room and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine-room, the combined engine and boiler rooms shall be considered as one compartment.

(2) In each boiler room or at an entrance outside of the boiler room at least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code shall be provided.

(3) At least two portable foam extinguishers or equivalent shall be provided in each firing space in each boiler room and in each space in which a part of the oil fuel installation is situated. There shall be at least one approved foam-type extinguisher of at least 135 litres capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room. In the case of domestic boilers of less than 175 kW or boilers protected by fixed water-based local application fire-extinguishing systems as required by Rule 101, an approved foam-type extinguisher of at least 135 litres capacity is not required.

(4) In each firing space there shall be a receptacle containing at least 0.1 m³ sand, sawdust impregnated with soda, or other approved dry material, along with a suitable shovel for spreading the material. An approved portable extinguisher may be substituted as an alternative.

Fire-extinguishing arrangements in machinery spaces of category A containing internal combustion machinery

97. (1) Machinery spaces of category A containing internal combustion machinery shall be provided with a fixed fire-extinguishing system in accordance with Rule 92. At least one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code shall be provided.

(2) In each machinery space of category A containing internal combustion machinery approved foam-type fire extinguishers shall be provided, each of at least 45 litres capacity or equivalent, sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, a sufficient number of portable foam extinguishers or equivalent shall be provided and shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space. For smaller spaces in a cargo ship the Minister may consider relaxing this requirement.

Fire-extinguishing arrangements in machinery spaces containing steam turbines or enclosed steam engines

98. (1) In machinery spaces containing steam turbines or enclosed steam engines used for main propulsion or other purposes having in the aggregate a total output of not less than 375 kW, a fire-extinguishing system in accordance with Rule 92 shall be provided if such spaces are periodically unattended.

- (2) (a) Approved foam fire extinguishers each of at least 45 litres capacity or equivalent shall be provided, sufficient in number to enable foam or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure-lubricated parts of the turbines, engines or associated gearing, and any other fire hazards.
- (b) The extinguishers to which subparagraph (a) refers shall not be required if protection, at least equivalent to that required by this

paragraph, is provided in such spaces by a fixed fire-extinguishing system fitted in compliance with Rule 92.

(3) A sufficient number of portable foam extinguishers or equivalent shall be provided and shall be so located that no point in the space is more than 10 m walking distance from an extinguisher and that there are at least two such extinguishers in each such space, except that such extinguishers shall not be required in addition to any provided in compliance with Rule 96(3).

Fire-extinguishing arrangements in other machinery spaces

99. Where, in the opinion of the Minister, a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing appliances are prescribed in Rules 96, 97 and 98, there shall be provided in or adjacent to that space such a number of approved portable fire extinguishers or other means of fire extinction as the Minister may deem sufficient.

Additional fire-extinguishing requirements for passenger ships

100. (1) In a passenger ship carrying more than 36 passengers, each machinery space of category A shall be provided with at least two suitable water fog applicators.

(2) In this Rule, a water fog applicator may consist of a metal L-shaped pipe, the long limb being about 2 m in length, capable of being fitted to a fire hose, and the short limb being about 250 mm in length, fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

Fixed local application fire-fighting systems

101.(1)(a) This Rule applies to a passenger ship of 500 gross tonnage and greater and a cargo ship of 2,000 gross tonnage and greater.

(b) In the case of a ship constructed before 1 July 2002, this Rule applies to a passenger ship of 2,000 gross tonnage and greater.

(2) Machinery spaces of category A above 500 m³ in volume shall, in addition to the fixed fire-extinguishing system required in Rule 96(1), be protected by an approved type of fixed water-based or equivalent local application fire-fighting system, based on the IMO Guidelines for the approval of fixed water-based local application fire-fighting systems for use in category A machinery spaces (MSC/Circ.913) (MSC.1/Circ.1387), Unified interpretations of the Guidelines for the approval of fixed water-based local application fire-fighting systems (MSC/Circ.913) (MSC/Circ.1082) and Unified interpretations of SOLAS Chapter II-2 (MSC.1/Circ.1276).

(3) In the case of periodically unattended machinery spaces, the fire-fighting system shall have both automatic and manual release capabilities.

(4) In the case of continuously manned machinery spaces, the fire-fighting system is required to have a manual release capability only.

(5) A fixed local application fire-fighting system shall protect the following areas without the necessity of engine shutdown, personnel evacuation, or sealing of the spaces:

- (a) the fire hazard portions of internal combustion machinery or, in the case of a ship constructed before 1 July 2014, the fire hazard portions of internal combustion machinery used for the main propulsion and power generation of a ship;
- (b) boiler fronts;
- (c) the fire hazard portions of incinerators; and
- (d) purifiers for heated fuel oil.

(6) Activation of any local application fire-fighting system shall give a visual and distinct audible alarm in the protected space and at continuously manned stations. The alarm shall indicate the specific system activated. The system alarm requirements described within this Rule are in addition to, and not a substitute for, the detection and fire alarm system required elsewhere in these Rules.

Fire-extinguishing arrangements in control stations, accommodation and service spaces

- 102.(1)(a) A passenger ship carrying more than 36 passengers shall be equipped with an automatic sprinkler, fire detection and fire alarm system of an approved type complying with the requirements of the Fire Safety Systems Code in all control stations, accommodation and service spaces, including corridors and stairways.
- (b) As an alternative to subparagraph (a), control stations, where water may cause damage to essential equipment, may be fitted with a fixed fire-extinguishing system of another type complying with the provisions of the Fire Safety Systems Code.
 - (c) Spaces having little or no fire risk such as voids, public toilets, carbon dioxide rooms and similar spaces are not required to be fitted with an automatic sprinkler system.

(2) In a passenger ship carrying not more than 36 passengers, when a fixed smoke detection and fire alarm system complying with the provisions of the Fire Safety Systems Code is provided only in corridors, stairways and escape routes within accommodation spaces, an automatic sprinkler system shall be installed in accordance with Rule 39(3)(b).

(3) A fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code shall be installed on cabin balconies of ships to which Rule 33 applies, where furniture and furnishings on such balconies are not as defined in Rule 33(2).

(4) In a cargo ship in which Method IIC specified in Rule 55(1)(b) is adopted, an automatic sprinkler, fire detection and fire alarm system shall be fitted in accordance with the requirements in Rule 39(5)(b).

- (5) Paint lockers and flammable liquid lockers shall be protected by:
- (a) a carbon dioxide system, designed to give a minimum volume of free gas equal to 40 per cent of the gross volume of the protected space;
 - (b) a dry powder system, designed for at least 0.5 kg powder/m³;
 - (c) a water spraying or sprinkler system, designed for 5 litres/m² min. Water spraying systems may be connected to the fire main of the ship; or
 - (d) a system providing equivalent protection, as determined by the Minister.

In any case, the system shall be operable from outside the protected space.

(6) For lockers of a deck area of less than 4 m² which do not give access to accommodation spaces, a portable carbon dioxide fire extinguisher sized to provide a minimum volume of free gas equal to 40 per cent of the gross volume of the space may be accepted in lieu of a fixed system. A discharge port shall be arranged in the locker to allow the discharge of the extinguisher without having to enter into the protected space. The required portable fire extinguisher shall be

stowed adjacent to the port or a port or hose connection may be provided to facilitate the use of fire main water.

(7) Deep-fat cooking equipment installed in enclosed spaces or on open decks shall be fitted with the following:

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

Fire-extinguishing arrangements in cargo spaces

103. (1) Except as provided for in paragraph (5), the cargo spaces of a passenger ship of 1,000 gross tonnage and greater shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or by a fixed high expansion foam fire-extinguishing system that gives equivalent protection.

(2) Where it is shown to the satisfaction of the Minister that a passenger ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of paragraph (1), and in a ship of less than 1,000 gross tonnage, the fire-extinguishing arrangements in cargo spaces shall be to the satisfaction of the Minister, provided that the ship is fitted with steel hatch covers and effective means of closing all ventilators and other openings leading to the cargo spaces.

(3) Except for ro-ro and vehicle spaces, cargo spaces on a cargo ship of 2,000 gross tonnage and greater shall be protected by a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, or by a fire-extinguishing system that gives equivalent protection.

- (4) (a) The Minister may exempt from the requirements of paragraphs (3) and (5), cargo spaces of any cargo ship if constructed, and solely intended for, the carriage of 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 the IMSBC Code, Appendix 1 entry for coal, and to the Lists of solid bulk cargoes for which a fixed gas fire-extinguishing system may be exempted or for which a fixed gas fire-extinguishing system is ineffective (IMO MSC.1/Circ.1395/Rev.1).

- (b) Exemptions such as those referred to in subparagraph (a) may be granted only if the ship is fitted with steel hatch covers and effective means of closing ventilators and other openings leading to the cargo spaces. When such exemptions are granted, the Minister shall issue an Exemption Certificate, irrespective of the date of construction of the ship concerned and shall ensure that the list of cargoes the ship is permitted to carry is attached to the Exemption Certificate.

(5) A ship engaged in the carriage of dangerous goods in any cargo spaces shall be provided with a fixed carbon dioxide or inert gas fire-extinguishing system complying with the provisions of the Fire Safety Systems Code or with a fire-extinguishing system which, in the opinion of the Minister, gives equivalent protection for the cargoes carried.

(6) The following requirements shall apply to a cargo ship constructed on or after 1 January 2016 and designed to carry containers on or above the weather deck:

- (a) in addition to the equipment and arrangements required by paragraphs (1) to (5), the ship shall carry at least one water mist lance consisting of a tube with a piercing nozzle which is capable of penetrating a container wall and producing water mist inside a confined space or container when connected to the fire main;
- (b) in addition to the requirements of subparagraph (a), ships designed to carry 5 or more tiers of containers on or above the weather deck shall carry mobile water monitors having regard to the Guidelines for the design, performance, testing and approval of mobile water monitors used for the protection of on-deck cargo areas of ships designed and constructed to carry five or more tiers of containers on or above the weather deck in MSC.1/Circ.1472, as follows:
 - (i) in a ship with a breadth of less than 30 m, at least two mobile water monitors shall be carried, or
 - (ii) in a ship with a breadth of 30 m or greater, at least 4 mobile water monitors shall be carried;
 - (iii) the mobile water monitors, all necessary hoses, fittings and required fixing hardware shall be kept ready for use in a location outside the cargo space area not likely to be cut-off in the event of a fire in the cargo spaces;
 - (iv) a sufficient number of fire hydrants shall be provided such that:
 - (I) all provided mobile water monitors can be operated simultaneously in order to create effective water barriers forward and aft of each container bay;
 - (II) the two jets of water required by Rule 81(1) can be supplied at the pressure required by Rule 82; and

- (III) each of the required mobile water monitors can be supplied by separate hydrants at the pressure necessary to reach the top tier of containers on deck;
- (v) the mobile water monitors may be supplied by the fire main, provided the capacity of fire pumps and fire main diameter are adequate to simultaneously operate the mobile water monitors and two jets of water from fire hoses at the required pressure values. If a cargo ship is carrying dangerous goods, the capacity of fire pumps and fire main diameter shall also comply with Rule 145(5), as far as applicable to on-deck cargo areas;
- (vi) the operational performance of each mobile water monitor shall be tested during initial survey on board the ship to the satisfaction of the Minister. The test shall verify that:
 - (I) the mobile water monitor can be securely fixed to the ship structure ensuring safe and effective operation; and
 - (II) the mobile water monitor jet reaches the top tier of containers with all required monitors and water jets from fire hoses operated simultaneously.

Cargo tank protection – fixed deck foam fire-extinguishing systems

104. (1) For tankers of 20,000 tonnes deadweight and greater, a fixed deck foam fire-extinguishing system shall be provided complying with the provisions of the Fire Safety Systems Code, except that, in lieu of this requirement, the Minister, after having given consideration to the ship's arrangement and equipment, may accept other fixed installations if they afford protection equivalent to the Fire Safety Systems Code. Alternative fixed installations shall comply with paragraph (2).

(2) In accordance with paragraph (1), where the Minister accepts an equivalent fixed installation in lieu of the fixed deck foam fire-extinguishing system, the installation shall:

- (a) be capable of extinguishing spill fires and preclude ignition of spilled oil not yet ignited; and
- (b) be capable of combating fires in ruptured tanks.

(3) A tanker of less than 20,000 tonnes deadweight shall be provided with a deck foam fire-extinguishing system complying with the requirements of the Fire Safety Systems Code.

Protection of cargo pump-rooms in tankers

105. (1) Each cargo pump-room shall be provided with one of the fixed fire-extinguishing systems set out in paragraph (2) operated from a readily accessible position outside the pump-room. Cargo pump-rooms shall be provided with a system suitable for machinery spaces of category A.

(2) A fixed fire-extinguishing system for the purposes of paragraph (1) may consist of:

- (a) a carbon dioxide fire-extinguishing system complying with the provisions the Fire Safety Systems Code and with the following:
 - (i) the alarms giving audible warning of the release of fire-extinguishing medium shall be safe for use in a flammable cargo vapour/air mixture; and
 - (ii) 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;
- (b) a high-expansion foam fire-extinguishing system complying with the provisions of the Fire Safety Systems Code, provided that the foam concentrate supply is suitable for extinguishing fires involving the cargoes carried; or
- (c) a fixed pressure water-spraying fire-extinguishing system complying with the provisions of the Fire Safety Systems Code.

(3) Where the fire-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 is not required to be more than the maximum required for the largest compartment.

Fire-fighter's outfits

106.(1)(a) A fire-fighter's outfit shall comply with the Fire Safety Systems Code.

- (b) Self-contained compressed air breathing apparatus of fire-fighter's outfits shall comply with paragraphs 2.1.2.1 and 2.1.2.2 of Chapter 3 of the Fire Safety Systems Code.

(2) Subject to paragraphs (3), (4) and (5), at least two fire-fighter's outfits shall be carried on a ship.

(3) In addition to the requirements in paragraph (2), in a passenger ship there shall be provided:

- (a) 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, two fire-fighter's outfits and, in addition, two sets of personal equipment, each set comprising the items stipulated in the Fire Safety Systems Code;
- (b) in a passenger ship carrying more than 36 passengers, two additional fire-fighter's outfits shall be provided for each main vertical zone. However, for stairway enclosures that constitute individual main vertical zones and for the main vertical zones in the fore or aft end of a ship that do not contain spaces of categories (6), (7), (8) or (12) defined in Rule 49, additional fire-fighter's outfits are not required; and

- (c) on a passenger ship carrying more than 36 passengers, for each pair of breathing apparatus, one water fog applicator shall be provided which shall be stored adjacent to such apparatus.

(4) In addition to the requirements in paragraph (2), in a tanker, two fire-fighter's outfits shall be provided.

(5) The Minister may require additional sets of personal equipment and breathing apparatus to be provided having due regard to the size and type of the ship.

(6) Two spare charges shall be provided for each required breathing apparatus. A passenger ship carrying not more than 36 passengers and a cargo ship that is equipped with suitably located means for fully recharging the air cylinders free from contamination, is required to carry only one spare charge for each required apparatus. In a passenger ship carrying more than 36 passengers, at least two spare charges for each breathing apparatus shall be provided.

(7) A passenger ship carrying more than 36 passengers constructed on or after 1 July 2010 shall be fitted with a suitably located means for fully recharging breathing air cylinders, free from contamination. The means for recharging shall be either:

- (a) breathing air compressors supplied from the main and emergency switchboard, or independently driven, with a minimum capacity of 60 litres/min per required breathing apparatus, not to exceed 420 litres/min; or
- (b) self-contained high-pressure storage systems of suitable pressure to recharge the breathing apparatus used on board, with a capacity of at least 1,200 litres per required breathing apparatus, not to exceed 50,000 litres of free air.

(8) The fire-fighter's outfits or sets of personal equipment shall be kept ready for use in an easily accessible location that is permanently and clearly marked and, where more than one fire-fighter's outfit or more than one set of personal equipment is carried, they shall be stored in widely separated positions.

(9) In a passenger ship, at least two fire-fighter's outfits and, in addition, one set of personal equipment shall be available at any one position. At least two fire-fighter's outfits shall be stored in each main vertical zone.

Fire-fighter's communication

107. A minimum of two two-way portable radiotelephone apparatus for each fire party for fire-fighter's communication shall be carried on board a ship. The two-way portable radiotelephone apparatus shall be of an explosion-proof type or intrinsically safe.

Material of hull, superstructures, structural bulkheads, decks and deckhouses

108. (1) The hull, superstructures, structural bulkheads, decks and deckhouses of a ship shall be constructed of steel or other equivalent material.

(2) For the purpose of applying the definition of steel or other equivalent material in Rule 2 the “applicable fire exposure” shall be according to the integrity and insulation standards given in Tables 1 and 2 to Rule 49 and Tables 1 and 2 to Rule 51, as appropriate.

Structure of aluminium alloy

109. Unless otherwise specified in Rule 108, in cases where any part of the structure of a ship is constructed of aluminium alloy, the following shall apply:

(1) the insulation of aluminium alloy components of “A” or “B” class divisions, except structure which, in the opinion of the Minister, is non-load-bearing, 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 the applicable fire exposure to the standard fire test; and

(2) special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and “A” and “B” class divisions to ensure:

- (a) that for such members supporting lifeboat and liferaft areas and “A” class divisions, the temperature rise limitation specified in paragraph (1) shall apply at the end of one hour; and
- (b) that for such members required to support “B” class divisions, the temperature rise limitation specified in paragraph (1) shall apply at the end of half an hour.

Machinery spaces of category A

110. (1) Crowns and casings of machinery spaces of category A shall be of steel construction and shall be insulated as required by Table 1 to Rule 57 and Table 1 to Rule 60, as appropriate.

(2) The floor plating of normal passageways in machinery spaces of category A shall be of steel construction.

Materials of overboard fittings

111. Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

Protection of cargo tank structure against pressure or vacuum in tankers

112. (1) The venting arrangements shall be so designed and operated as to ensure that neither pressure nor vacuum in cargo tanks shall exceed design parameters and shall be such as to provide for:

- (a) the flow of the small volumes of vapour, air or inert gas mixtures caused by thermal variations in a cargo tank in all cases through pressure/vacuum valves; and
- (b) the passage of large volumes of vapour, air or inert gas mixtures during cargo loading and ballasting, or during discharging.

(2) Openings for pressure release required by paragraph (1)(a) shall:

- (a) have as great a height as is practicable above the cargo tank deck to obtain maximum dispersal of flammable vapours, but in no case less than 2 m above the cargo tank deck; and
- (b) be arranged at the furthest distance practicable but not less than 5 m from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery and equipment which may constitute an ignition hazard. Anchor windlass and chain locker openings constitute an ignition hazard.

In a tanker constructed on or after 1 January 2017, the openings shall be arranged in accordance with Rule 17(7)(a).

(3) Provisions shall be made in cargo tanks to guard against liquid rising in the venting system to a height which would exceed the design head of cargo tanks. This shall be accomplished by high-level alarms or overflow control systems or other equivalent means, together with independent gauging devices and cargo tank filling procedures. For the purposes of this Rule, spill valves are not considered equivalent to an overflow system.

(4) A secondary means of allowing full flow relief of vapour, air or inert gas mixtures shall be provided to prevent over-pressure or under-pressure in the event of failure of the arrangements in paragraph (1)(b). In addition, in tankers constructed on or after 1 January 2017, the secondary means shall be capable of preventing over-pressure or under-pressure in the event of damage to, or inadvertent closing of, the means of isolation required in Rule 17(3). Alternatively, pressure sensors may be fitted in each tank protected by the arrangement required in paragraph (1)(b), with a monitoring system in the ship's cargo control room or the position from which cargo operations are normally carried out. Such monitoring equipment shall also provide an alarm facility which is activated by detection of over-pressure or under-pressure conditions within a tank.

(5) Pressure/vacuum valves required by paragraph (1)(a) may be provided with a bypass arrangement when they are located in a vent main or masthead riser. Where such an arrangement is provided, there shall be suitable indicators to show whether the bypass is open or closed.

(6) One or more pressure/vacuum-breaking devices shall be provided to prevent the cargo tanks from being subject to:

- (a) 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 are left shut; and
- (b) a negative pressure in excess of 700 mm water gauge if the cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blowers were to fail.

Such devices shall be installed on the inert gas main unless they are installed in the venting system required by Rule 17(1) or on individual cargo tanks. The location and design of the devices shall be in accordance with Rule 17 and this Rule.

(7) Vent outlets for cargo loading, discharging and ballasting required by paragraph (1)(b) shall be designed on the basis of the maximum designed loading rate multiplied by a factor of at least 1.25 to take account of gas evolution, in order to prevent the pressure in any cargo tank from exceeding the design pressure. The master of a ship shall be provided with information regarding the maximum permissible loading rate for each cargo tank and in the case of combined venting systems, for each group of cargo tanks.

PART 4

ESCAPE

Notification of crew and passengers

113. (1) For the purpose of a safe evacuation, a general emergency alarm system and a public address system shall be provided to notify crew and passengers in the event of a fire.

(2) A general emergency alarm system in accordance with Rule 7(4)(a)(ii) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018) shall be provided and used to notify crew and passengers in the event of a fire.

(3) In a passenger ship, a public address system or other effective means of communication complying with the requirements of Rule 7(5) of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018) shall be available throughout the accommodation and service spaces and control stations and open decks.

Means of escape

114. (1) Unless expressly provided otherwise in these Rules, at least two widely separated and ready means of escape shall be provided from all spaces or group of spaces on a ship.

(2) For the purpose of compliance with this Rule, a lift shall not be considered as forming one of the means of escape.

Means of escape from control stations, accommodation and service spaces

115. (1) Stairways and ladders shall be so arranged as to provide ready means of escape to the lifeboat and liferaft embarkation deck from passenger and crew accommodation spaces and from spaces in which the crew is normally employed, other than machinery spaces.

(2) Unless expressly provided otherwise in these Rules, the provision of a corridor, lobby, or part of a corridor from which there is only one route of escape shall be prohibited. Dead-end corridors used in service areas which are necessary for the practical utility of the ship, such as fuel oil stations and athwartship supply corridors, shall be permitted, provided such dead-end corridors are separated from crew accommodation areas and are inaccessible from passenger accommodation areas. A part of a corridor that has a depth not exceeding its width is considered a recess or local extension and is permitted.

(3) All stairways in accommodation and service spaces and control stations shall be of steel frame construction except where the Minister sanctions the use of other equivalent material.

(4) If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to the station shall be provided, one of which may be a porthole or window of sufficient size or other means to the satisfaction of the Minister.

(5) Doors in escape routes shall, in general, open in way of the direction of escape, except that:

- (a) individual cabin doors may open into the cabins in order to avoid injury to persons in the corridor when the door is opened; and
- (b) doors in vertical emergency escape trunks may open out of the trunk in order to permit the trunk to be used both for escape and for access.

Means of escape in passenger ships

116. (1) This Rule applies to a passenger ship.

(2) Below the bulkhead deck, two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Minister may dispense with one of the means of escape for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

(3) Where the Minister has granted dispensation under paragraph (2), this sole means of escape shall provide safe escape. However, stairways shall not be less than 800 mm in clear width and shall have handrails on both sides.

(4) Above the bulkhead deck there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces, at least one of which shall give access to a stairway forming a vertical escape.

(5) Stairway enclosures in accommodation and service spaces shall have direct access from 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 non-hazardous safety equipment and open information counters are permitted. Only corridors, lifts, public toilets, special category spaces and open ro-ro spaces to which any passengers carried can have access, other escape stairways required by paragraph (6) and external areas are permitted to have direct access to these stairway enclosures. Public spaces may also have direct access to stairway enclosures except for the backstage of a theatre. Small corridors or “lobbies” used to separate an enclosed stairway from galleys or main laundries may have direct access to the stairway provided they have a minimum deck area of 4.5 m², a width of no less than 900 mm and contain a fire hose station.

(6) At least one of the means of escape required by paragraphs (2) and (4) 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 underfoot. 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 the Tables to Rule 49 or to Rule 51, as appropriate.

(7) Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be provided either directly or through protected internal routes which have fire integrity and insulation values for stairway enclosures as determined by the Tables to Rule 49 or to Rule 51, as appropriate.

(8) Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.

(9) Each level within an atrium shall have two means of escape, one of which shall give direct access to an enclosed vertical means of escape meeting the requirements of paragraph (6).

(10) The widths, number and continuity of escapes shall be in accordance with the requirements in the Fire Safety Systems Code.

(11) (a) In addition to the emergency lighting required by Safety Convention regulation II-1/42 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 300 mm above the deck at all points of the escape route including angles and intersections. The marking must enable passengers to identify 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, 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 has been evaluated, tested and applied in accordance with the Fire Safety Systems Code.

- (b) In a passenger ship carrying more than 36 passengers, the requirements of subparagraph (a) shall also apply to the crew accommodation areas.
- (c) In a passenger ship constructed on or after 1 July 2010, in lieu of the escape route lighting system required by subparagraph (a), alternative evacuation guidance systems may be accepted if approved by the Minister based on IMO guidelines such as the Functional requirements and performance standards for the assessment of evacuation guidance systems in IMO MSC/Circ.1167 and the Interim guidelines for the testing, approval and maintenance of evacuation guidance systems used as an alternative to low-location lighting systems in IMO MSC/Circ.1168.

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

(13) Escape doors from public spaces that are normally latched shall be fitted with a means of quick release. Such means shall consist of a door-latching mechanism incorporating a device that releases the latch upon the application of a force in the direction of escape flow. Quick release mechanisms shall be designed and installed to the satisfaction of the Minister and shall, in particular:

- (a) consist of bars or panels, the actuating portion of which extends across at least one half of the width of the door leaf, at least 760 mm and not more than 1,120 mm above the deck;
 - (b) cause the latch to release when a force not exceeding 67 N is applied; and
 - (c) not be equipped with any locking device, set screw or other arrangement that prevents the release of the latch when pressure is applied to the releasing device.
- (14) (a) Escape routes shall be evaluated by an evacuation analysis early in the design process having regard to the IMO Revised Guidelines on evacuation analysis for new and existing passenger ships in MSC.1/Circ.1533, in its updated version. This analysis shall apply to:
- (i) ro-ro passenger ships constructed on or after 1 July 1999; and
 - (ii) other passenger ships constructed on or after 1 January 2020 carrying more than 36 passengers.

- (b) The analysis referred to in subparagraph (a) 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.

Means of escape in cargo ships

117. (1) This Rule applies to a cargo ship.

(2) At all levels of accommodation at least two widely separated means of escape from each restricted space or group of spaces shall be provided. Exceptionally, the Minister may dispense with one of the means of escape, for crew spaces that are entered only occasionally, if the required escape route is independent of watertight doors.

(3) Below the lowest open deck, the main means of escape shall be a stairway and the second means of escape may be a trunk or a stairway.

(4) Above the lowest open deck, the means of escape shall be stairways or doors to an open deck or a combination thereof.

(5) Dead-end corridors having a length greater than 7 m shall not be accepted.

(6) The width, number and continuity of escape routes shall be in accordance with the requirements in the Fire Safety Systems Code.

Emergency escape breathing devices

118.(1)(a) Emergency escape breathing devices provided on a ship shall comply with the Fire Safety Systems Code.

(b) Spare emergency escape breathing devices shall be kept on board a ship.

(c) On all ships, within the machinery spaces, emergency escape breathing devices shall be situated ready for use at easily visible places, which can be reached quickly and easily at any time in the event of fire. The location of emergency escape breathing devices shall take into account the layout of the machinery space and the number of persons normally working in the spaces.

(2) All ships shall carry at least two emergency escape breathing devices within accommodation spaces.

(3) In a passenger ship, at least two emergency escape breathing devices shall be carried in each main vertical zone.

(4) In a passenger ship carrying more than 36 passengers, two emergency escape breathing devices in addition to those required in paragraph (3) shall be carried in each main vertical zone.

(5) Paragraphs (3) and (4) shall not apply to:

- (a) stairway enclosures that constitute individual main vertical zones, and
- (b) 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) as described in Rule 49.

(6) The number and location of the emergency escape breathing devices on a ship shall be indicated in the fire control plan required in accordance with Rule 131.

Means of escape from machinery spaces on passenger ships

119. (1) This Rule applies to a passenger ship.

(2) The means of escape from each machinery space in a passenger ship shall comply with this Rule.

(3) Where the machinery space is below the bulkhead deck, the two means of escape shall consist of either:

- (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 appropriate lifeboat and liferaft embarkation decks. One of the ladders shall be located within a protected enclosure that satisfies Rule 49, category (2), or Rule 51, category (4), as appropriate, from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The protected enclosure shall have minimum internal dimensions of at least 800 mm x 800 mm, and shall have emergency lighting provisions; or
- (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the 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 access to a safe escape route from the lower part of the space to the embarkation deck.

(4) Where the machinery space is above the bulkhead deck, the two 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 means of escape require the use of ladders, the ladders shall be of steel construction.

- (5) (a) In a passenger ship of less than 1,000 gross tonnage, the Minister may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space.
 - (b) In a passenger ship of 1,000 gross tonnage and greater, the Minister may dispense with one means of escape from any such space, including a normally unattended auxiliary machinery space, so long as either a door or a steel ladder provides a safe escape route to the embarkation deck, due regard being paid to the nature and location of the space and whether persons are normally employed in that space.
 - (c) In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck.
- (6) Two means of escape shall be provided from a machinery control room located within a machinery space, at least one of which shall provide continuous fire shelter to a safe position outside the machinery space.
- (7) The following requirements apply to a passenger ship constructed on or after 1 January 2016:
- (a) all inclined ladders and stairways fitted to comply with paragraph (3) with open treads in machinery spaces, being part of or providing access to escape routes but not located within a protected enclosure, shall be made of steel. Such ladders and stairways shall be fitted with steel shields attached to their undersides, such as to provide protection against heat and flame from beneath for escaping personnel;
 - (b) two means of escape shall be provided from the main workshop within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space;
 - (c) in applying the requirements of this paragraph, where appropriate, regard shall be had to IMO Circular MSC.1/Circ.1511, Unified Interpretations of SOLAS regulations II-2/9 and II-2/13.

Means of escape from machinery spaces on cargo ships

120. (1) This Rule applies to a cargo ship.
- (2) The means of escape from each machinery space in a cargo ship shall comply with this Rule.
- (3) Except as provided in paragraph (4), 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 shall be provided 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 open deck.

One of these ladders shall be located within a protected enclosure that satisfies Rule 49, category (4), from the lower part of the space it serves to a safe position outside the space. Self-closing fire doors of the same fire integrity standards shall be fitted in the enclosure. The ladder shall be fixed in such a way that heat is not transferred into the enclosure through non-insulated fixing points. The enclosure shall have minimum internal dimensions of at least 800 mm x 800 mm, and shall have emergency lighting provisions;
or

- (b) one steel ladder shall be provided leading to a door in the upper part of the space from which access is provided to the open deck and, additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door shall be provided that is 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 open deck.

(4) In a cargo ship of less than 1,000 gross tonnage, the Minister may dispense with one of the means of escape required under paragraph (3), due regard being paid to the dimension and disposition of the upper part of the space. In addition, the means of escape from machinery spaces of category A is not required to comply with the requirement for an enclosed fire shelter in accordance with paragraph (3)(a). In the steering gear space, a second means of escape shall be provided when the emergency steering position is located in that space unless there is direct access to the open deck.

(5) From machinery spaces other than those of category A, two escape routes shall be provided except that a single escape route may be accepted for spaces that are entered only occasionally, and for spaces where the maximum travel distance to the door is 5 m or less.

(6) The following requirements apply to a cargo ship constructed on or after 1 January 2016:

- (a) all inclined ladders and stairways fitted to comply with paragraph (3) with open treads in machinery spaces, being part of or providing access to escape routes but not located within a protected enclosure, shall be made of steel. Such ladders and stairways shall be fitted with steel shields attached to their undersides, such as to provide protection against heat and flame from beneath for escaping personnel;
- (b) two means of escape shall be provided from the machinery control room located within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space;
- (c) two means of escape shall be provided from the main workshop within a machinery space. At least one of these escape routes shall provide a continuous fire shelter to a safe position outside the machinery space.
- (d) in applying the requirements of this paragraph, where appropriate, regard shall be had to IMO Circular

MSC.1/Circ.1511, Unified Interpretations of SOLAS regulations II-2/9 and II-2/13.

Means of escape on passenger ships from special category and open ro-ro spaces to which any passengers carried can have access

121. (1) In special category and open ro-ro spaces to which any passengers carried on a passenger ship can have access, the number and locations of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Minister and, in general, the safety of access to the embarkation deck shall be at least equivalent to that provided for in Rule 116(2), (4), (6) and (7). Such spaces shall be provided with designated walkways to the means of escape with a breadth of at least 600 mm. The parking arrangements for the vehicles shall be such as to ensure that the walkways are kept clear at all times.

(2) One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.

Means of escape from ro-ro spaces

122. At least two means of escape shall be provided in ro-ro spaces where the crew are normally employed. The escape routes shall provide a safe escape to the lifeboat and liferaft embarkation decks and shall be located at the fore and aft ends of the space.

Additional requirements for ro-ro passenger ships

123. (1) This Rule applies to a ro-ro passenger ship constructed on or after 1 July 2002.

(2) Escape routes shall be provided from every normally occupied space on 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 shall be marked with symbols based on IMO resolution A.760(18), in its updated version, or tables 1 and 2 of Escape Route Signs and Equipment Location Markings (IMO resolution A.1116(30)), as appropriate. Where the symbols for a specific item are differently expressed in IMO resolutions A.760(18) and A.1116(30), the new symbols in tables 1 and 2 of IMO resolution A.1116(30) shall be marked.

(3) 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 or to climb more than two decks up or down from any passenger space in order to reach an assembly station or open deck.

(4) External routes shall be provided from open decks, as referred to in paragraph (3), to the survival craft embarkation stations.

(5) 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.

(6) 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 if 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.

- (7) (a) In the interest of providing instruction for safe escape, decks shall be sequentially numbered, starting with "1" at the tank top or lowest deck. The 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.
- (b) 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.
- (8) (a) (i) Handrails or other handholds shall be provided in corridors along the entire escape route so that a firm handhold is available at every step of the way, where possible, to the assembly stations and embarkation stations.
- (ii) Handrails provided in accordance with clause (i) shall be provided on both sides of longitudinal corridors greater than 1.8 m in width and transverse corridors greater than 1 m in width. Particular attention shall be paid to the need for persons to be able to cross lobbies, atriums and other large open spaces along escape routes.
- (iii) 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.
- (b) 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.

PART 5

OPERATIONAL REQUIREMENTS

Operational readiness and maintenance

124.(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 being repaired or in lay-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

125. (1) Maintenance, testing and inspections shall be carried out based on the IMO Revised Guidelines for the maintenance and inspection of fire protection systems and appliances in MSC/Circ.1432 as amended by MSC.1/Circ.1516 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

126. (1) In addition to the fire protection systems and appliances listed in Rule 125(2)(c), a passenger ship carrying more than 36 passengers shall develop a maintenance plan for low-location lighting and public address systems.

(2) In addition to the requirements of Rule 129(3), fire drills on a passenger ship 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 the notification of passengers and the movement of passengers to assembly stations and embarkation decks.

(3) In a passenger ship carrying more than 36 passengers, plans and booklets provided in accordance with Rule 131 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).

Additional requirements for tankers

127. In addition to the fire protection systems and appliances listed in Rule 125(2)(c), a tanker shall develop 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.

Instructions, duties and organisation

128. (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

129. (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) 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.

(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).

(6) An onboard means of recharging breathing apparatus cylinders used during drills shall be provided or a corresponding number of spare cylinders shall be carried on board a ship to replace those cylinders that are used.

Training manuals

130. (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

131. (1) The owner of a ship shall ensure that general arrangement fire control plans shall be permanently exhibited for the guidance of the ship's officers.

(2) The general arrangement fire control plans shall:

- (a) be prepared having regard to the Graphical symbols for shipboard fire control plans as adopted by the IMO by resolution A.952(23) or Table 3 of Escape Route Signs and Equipment Location Markings (resolution A.1116(30)), as appropriate. Where the symbols for a specific item are differently expressed in resolutions A.952(23) and A.1116(30), the symbols in Table 3 of resolution A.1116(30) shall be used;
- (b) show clearly for each deck of a ship the control stations, the various fire sections enclosed by "A" class divisions, the sections enclosed by "B" class divisions together with particulars of the fire detection and fire alarm systems, the sprinkler installation, the fire-extinguishing appliances, means of access to different compartments, decks and other areas, and the ventilating system, including particulars of the fan control positions, the position of dampers and identification numbers of the ventilating fans serving each section.

(3) As an alternative to paragraph (2), 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; any alterations thereto shall be recorded as soon as practicable. Description in such plans and booklets shall be in the English language or languages required by the Minister.

(4) A duplicate set of fire control plans or a booklet containing such plans shall be permanently stored in a prominently marked weathertight enclosure outside the deckhouse 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 MSC/Circ.451.

Fire safety operational booklets

132. (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 130.

Additional requirements for tankers – procedures for cargo tank purging and gas freeing

133. (1) In a tanker, the fire safety operational booklet provided in accordance with Rule 132 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 and/or gas-freeing taking into account the provisions of paragraphs (2), (3), (4) and (5).

(2) When a tanker is provided with an inert gas system, the cargo tanks shall first be purged in accordance with Rule 23 until the concentration of hydrocarbon vapours in the cargo tanks has been reduced to less than 2 per cent by volume. Thereafter, gas-freeing may take place at the cargo tank deck level.

(3) When a tanker is not provided with an inert gas system, the operation shall be such that the flammable vapour is discharged initially through:

- (a) the vent outlets as specified in Rule 17(7);
- (b) outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 30 m/s maintained during the gas-freeing operation; or

- (c) outlets at least 2 m above the cargo tank deck level with a vertical efflux velocity of at least 20 m/s and which are protected by suitable devices to prevent the passage of flame.

(4) The outlets referred to in paragraph (3) shall be located not less than 10 m, measured horizontally, from the nearest air intakes and openings to enclosed spaces containing a source of ignition and from deck machinery, which may include anchor windlass and chain locker openings, and equipment which may constitute an ignition hazard.

(5) When the flammable vapour concentration at the outlet has been reduced to 30 per cent of the lower flammable limit, gas-freeing may be continued at cargo tank deck level.

- (6) (a) The inert gas system for tankers required in accordance with Rule 19 shall be so operated as to render and maintain the atmosphere of the cargo tanks non-flammable, except when such tanks are required to be gas-free.
- (b) Notwithstanding subparagraph (a), in the case of chemical tankers, the application of inert gas may take place after the cargo tank has been loaded, but before commencement of unloading, and shall continue to be applied until that cargo tank has been purged of all flammable vapours before gas-freeing. Only nitrogen is acceptable as inert gas under this provision.
- (c) Notwithstanding Rule 3(3) and (8), the provisions of this paragraph shall only apply to tankers constructed on or after 1 January 2016. If the oxygen content of the inert gas exceeds 5 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the gas improves, all operations in those cargo tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the cargo tanks. The gas regulating valve, if fitted, shall be closed and the off-specification gas shall be vented to atmosphere.
- (d) In the event that the inert gas system is unable to meet the requirement in subparagraph (a) and it has been assessed that it is impractical to effect a repair, then cargo discharge and cleaning of those cargo tanks requiring inerting shall only be resumed when suitable emergency procedures have been followed, taking into account the IMO Clarification of inert gas system requirements under the Safety Convention (MSC/Circ.485) and the Revised Guidelines for inert gas systems (MSC/Circ.353), as amended by MSC/Circ.387.

PART 6

ALTERNATIVE DESIGN AND ARRANGEMENTS FOR FIRE SAFETY

Alternative design and arrangements – engineering analysis

134. (1) Fire safety design and arrangements on a ship may deviate from the prescriptive requirements set out in Part 2, 3, 4, 5 or 7, provided that the design and arrangements meet the fire safety objectives and the functional requirements.

(2) When fire safety design or arrangements on a ship deviate from the prescriptive requirements of these Rules, engineering analysis, evaluation and approval of the alternative design and arrangements shall be carried out in accordance with this Rule.

(3) The engineering analysis of the alternative design and arrangements for fire safety for the purposes of this Rule shall be prepared and submitted to the Minister, based on the IMO Guidelines on alternative design and arrangements for fire safety in MSC/Circ.1002 and shall include, as a minimum, the following elements:

- (a) determination of the ship type and space(s) concerned;
- (b) identification of prescriptive requirement(s) with which the ship or the space(s) will not comply;
- (c) identification of the fire and explosion hazards of the ship or the space(s) concerned, including:
 - (i) identification of the possible ignition sources;
 - (ii) identification of the fire growth potential of each space concerned;
 - (iii) identification of the smoke and toxic effluent generation potential for each space concerned;
 - (iv) identification of the potential for the spread of fire, smoke or of toxic effluents from the space(s) concerned to other spaces;
- (d) determination of the required fire safety performance criteria for the ships or the space(s) concerned addressed by the prescriptive requirement(s), in particular performance criteria shall:
 - (i) be based on the fire safety objectives and on the functional requirements of these Rules;
 - (ii) provide a degree of safety not less than that achieved by using the prescriptive requirements; and
 - (iii) be quantifiable and measurable;
- (e) detailed description of the alternative design and arrangements, including a list of the assumptions used in the design and any proposed operational restrictions or conditions; and

- (f) technical justification demonstrating that the alternative design and arrangements meet the required fire safety performance criteria.

Evaluation of the alternative design and arrangements

135. (1) The engineering analysis required in accordance with Rule 134(3) may be evaluated and approved by the Minister taking into account the IMO Guidelines on alternative design and arrangements for fire safety in MSC/Circ.1002 and its Corr.1, Corr.2 and Corr.3, as amended by MSC.1/Circ.1552.

(2) A copy of the documentation, as approved by the Minister, indicating that the alternative design and arrangements for fire safety comply with this Rule shall be carried on board the ship.

(3) Pertinent information concerning alternative design and arrangements for fire safety as approved by the Minister under this Rule shall be communicated to the IMO.

(4) If the assumptions and operational restrictions that were stipulated in the alternative design and arrangements for fire safety are changed, the engineering analysis required in accordance with Rule 134(3) shall be carried out under the changed conditions and may be considered and approved by the Minister in accordance with this Rule.

PART 7

SPECIAL REQUIREMENTS

Helicopter facilities

136. (1) In addition to complying with the requirements of relevant Rules in Parts 2, 3, 4 and 5, a ship equipped with a helideck shall comply with the requirements of Rules 136 to 142.

(2) Where helicopters land or conduct winching operations on an occasional or emergency basis on a ship without a helideck, fire-fighting equipment fitted in accordance with the requirements in Part 3 may be used. This equipment shall be made readily available in close proximity to the landing or winching areas during helicopter operations.

(3) Notwithstanding the requirements of paragraph (2), ships constructed on or after 1 January 2020 having a helicopter landing area shall be provided with foam fire-fighting appliances which comply with the relevant provisions of chapter 17 of the Fire Safety Systems Code.

(4) Notwithstanding the requirements of paragraphs (2) and (3), a ro-ro passenger ship without a helideck shall comply with Rule 29 of the Merchant Shipping (Life-Saving Appliances) Rules 2018 (S.I. No. 438 of 2018).

Structure of helidecks

137. (1) Subject to paragraph (2) and to protect a ship from the fire hazards associated with helicopter operations, in general the construction of the helidecks shall be of steel or other equivalent materials. If the helideck forms the deckhead of a deckhouse or superstructure, it shall be insulated to “A-60” class standard.

(2) Notwithstanding paragraph (1), the Minister may permit a helideck constructed of aluminium or other low melting point metal construction that is not made equivalent to steel where the following provisions are satisfied:

- (a) 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; and
- (b) if the platform is located above the ship's deckhouse or similar structure,
 - (i) the deckhouse top and bulkheads under the platform shall have no openings;
 - (ii) windows under the platform shall be provided with steel shutters; and
 - (iii) after each fire on the platform or in close proximity, the platform shall undergo a structural analysis to determine its suitability for further use.

Helidecks – means of escape

138. A helideck shall be provided with both a main and an emergency means of escape and access for fire-fighting and rescue personnel. These means of escape shall be located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

Helidecks – fire-fighting appliances

139. (1) In close proximity to the helideck, the following fire-fighting appliances shall be provided and stored near the means of access to that helideck, and having regard in the case of subparagraphs (a) and (b) to the Unified Interpretation of SOLAS Chapter II-2 on the number and arrangement of portable fire extinguishers on board ships in MSC.1/Circ.1275 in its updated version:

- (a) at least two dry powder extinguishers having a total capacity of not less than 45 kg;
- (b) carbon dioxide extinguishers of a total capacity of not less than 18 kg or equivalent;
- (c) a suitable foam application system consisting of monitors or foam making branch pipes capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can

operate. The system shall be capable of delivering a discharge rate as required in Table 1 for at least 5 minutes;

Table 1 - Foam discharge rates

Category	Helicopter overall length	Discharge rate foam solution (litres/min)
H1	less than 15 m	250
H2	between 15 m and less than 24 m	500
H3	between 24 m and less than 35 m	800

- (d) the principal agent shall be suitable for use with salt water and conform to performance standards not inferior to those in the International Civil Aviation Organization Airport Services Manual, part 1 - Rescue and Fire fighting, Chapter 8 - Extinguishing Agent Characteristics, Paragraph 8.1.5 - Foam Specifications Table 8-1, Level 'B';
- (e) at least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck;
- (f) in addition to the requirements of Rule 106, two sets of fire-fighter's outfits; and
- (g) at least the following equipment, stored in a manner that provides for immediate use and protection from the elements:
 - (i) adjustable wrench;
 - (ii) fire-resistant blanket;
 - (iii) 60 cm bolt cutters;
 - (iv) grab or salving hook;
 - (v) heavy duty hacksaw complete with 6 spare blades;
 - (vi) ladder;
 - (vii) lift line, 5 mm diameter and 15 m in length;
 - (viii) side-cutting pliers;
 - (ix) set of assorted screwdrivers; and
 - (x) harness knife complete with sheath.

(2) In a ship constructed on or after 1 January 2020 and having a helideck, in lieu of the requirements of paragraph (1)(c), (d) and (e), foam fire-fighting appliances shall be provided which comply with the provisions of the Fire Safety Systems Code.

Helidecks – drainage facilities

140. Drainage facilities in way of helidecks shall –

- (1) be constructed of steel,

- (2) lead directly overboard independent of any other system, and
- (3) be designed so that drainage does not fall onto any part of the ship.

Helicopter refuelling and hangar facilities

141. Where a ship has helicopter refuelling and hangar facilities, the following requirements shall apply:

(1) a designated area shall be provided for the storage of fuel tanks which shall be:

- (a) as remote as is practicable from accommodation spaces, escape routes and embarkation stations; and
- (b) isolated from areas containing a source of vapour ignition;

(2) the fuel storage area shall be provided with arrangements whereby fuel spillage may be collected and drained to a safe location;

(3) tanks and associated equipment shall be protected against physical damage and from a fire in an adjacent space or area;

(4) where portable fuel storage tanks are used, special attention shall be given to:

- (a) design of the tank for its intended purpose;
- (b) mounting and securing arrangements;
- (c) electric bonding; and
- (d) inspection procedures;

(5) storage tank fuel pumps shall be provided with means which permit shutdown from a safe remote location in the event of a fire. Where a gravity fuelling system is installed, equivalent closing arrangements shall be provided to isolate the fuel source;

(6) the fuel pumping unit shall be connected to one tank at a time. The piping between the tank and the pumping unit shall be of steel or equivalent material, as short as possible, and protected against damage;

(7) electrical fuel pumping units and associated control equipment shall be of a type suitable for the location and potential hazards;

(8) fuel pumping units shall incorporate a device which will prevent over-pressurization of the delivery or filling hose;

(9) equipment used in refuelling operations shall be electrically bonded;

(10) "NO SMOKING" signs shall be displayed at appropriate locations;

(11) hangar, refuelling and maintenance facilities shall be treated as category 'A' machinery spaces with regard to structural fire protection, fixed fire-extinguishing and detection system requirements;

(12) enclosed hangar facilities or enclosed spaces containing refuelling installations shall be provided with mechanical ventilation, as required by Rules 157 to 159 in the case of closed ro-ro spaces of cargo ships. Ventilation fans shall be of non-sparking type; and

(13) electric equipment and wiring in enclosed hangars or enclosed spaces containing refuelling installations shall comply with Rule 159(2), (3) and (4).

Operations manual and fire-fighting arrangements for a helicopter facility

142. (1) Each helicopter facility shall have an operations manual, including a description and a checklist of safety precautions, procedures and equipment requirements. This manual may be part of the ship's emergency response procedures.

(2) The procedures and precautions to be followed during refuelling operations shall be in accordance with recognized safe practices and shall be contained in the operations manual referred to in paragraph (1).

(3) Fire-fighting personnel, consisting of at least two persons trained for rescue and fire-fighting duties, and fire-fighting equipment shall be immediately available at all times on a ship when helicopter operations are expected.

(4) Fire-fighting personnel shall be present during refuelling operations on a ship. However, the fire-fighting personnel shall not be involved with refuelling activities.

(5) On-board refresher training shall be carried out on a ship and additional supplies of fire-fighting media shall be provided for training and testing of the equipment.

Carriage of dangerous goods - application and general requirements

143. (1) In a ship carrying dangerous goods, the following functional requirements shall be met:

- (a) fire protection systems shall be provided to protect the ship from the added fire hazards associated with carriage of dangerous goods;
- (b) dangerous goods shall be adequately separated from ignition sources; and
- (c) appropriate personnel protective equipment shall be provided for the hazards associated with the carriage of dangerous goods.

(2) Subject to paragraph (4), in addition to complying with the requirements of relevant Rules in Parts 2, 3, 4 and 5 and Rules 136 to 142 and Rules 156 to 163 as appropriate, a ship type and cargo space, referred to in paragraph (5), intended for the carriage of dangerous goods shall comply with the requirements of Rules 143 to 154 as appropriate, except when carrying dangerous goods in limited quantities having regard to Chapter 3.4 of the IMDG Code and excepted quantities having regard to Chapter 3.5 of the IMDG Code, unless such requirements have already been met by compliance with the requirements elsewhere in these Rules. The types of ships and modes of carriage of dangerous goods are referred to in paragraph (5) and in Table 1 to this Rule.

(3) A cargo ship of less than 500 gross tonnage shall comply with Rules 143 to 154, but the Minister may reduce the requirements and such reduced

requirements shall be recorded in the document of compliance referred to in Rule 155.

(4) Rules 143 to 154 shall not apply to a ship or a cargo space when carrying dangerous goods in limited quantities as referred to in Chapter 3.4 of the IMDG Code.

(5) For the purpose of determining the application of the requirements of Rules 144 to 154, the following categories of ship types and cargo spaces shall govern the application of Tables 1 and 2 to this Rule:

Category (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;

Category (B) – purpose-built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;

Category (C) – ro-ro ships and ro-ro spaces intended for the carriage of dangerous goods;

Category (D) – ships and cargo spaces intended for the carriage of solid dangerous goods in bulk; and

Category (E) – ships and cargo spaces intended for carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

Table 1 - Application of the requirements to different modes of carriage of dangerous goods in ships and cargo spaces

Where X appears in Table 1, it means this requirement is applicable to all classes of dangerous goods as given in the appropriate row of Table 3, except as indicated by the notes.

Rule Number	Rule 143(5) Weather decks (A) to (E) inclusive	(A) Not specifically designed	(B) Container cargo spaces	(C)		(D) Solid dangerous goods in bulk	(E) Shipborne barges
				Closed ro-ro cargo spaces ⁵	Open ro-ro cargo spaces		
145(1)	x	X	x	X	x	For application of requirements of Rules 143 to 155 to different classes of dangerous goods - see Table 2	x
145(2)	x	X	x	X	x		-
145(3)	-	X	x	X	x		x
145(4)	-	X	x	X	x		x
146	-	X	x	X	x		x ⁴
147	-	X	x	X	-		x ⁴
148(1)	-	X	x ¹	X	-		x ⁴
148(2)	-	X	x ¹	X	-		x ⁴
149	-	X	x	X	-		-
150(1)	x	X	x	X	x		-
150(2)	x	X	x	X	x		-
151	x	X	-	-	x		-
152	x	X	x ²	X	x		-
153	-	-	-	x ³	x		-
154(1)	-	-	-	x	-		-
154(2)	-	-	-	X	-		-

Notes:

¹ For classes 4 and 5.1 solids 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 per hour. For classes 4 and 5.1 liquids when carried in closed freight containers, the ventilation rate may be reduced to not less than two air changes per hour. 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 spaces, not capable of being sealed.

⁴ 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.

⁵ Special category spaces shall be treated as closed ro-ro spaces when dangerous goods are carried.

Table 2 - Application of the requirements to different classes of dangerous goods for ships and cargo spaces carrying solid dangerous goods in bulk

Class of Dangerous Goods Rule Number	4.1	4.2	4.3 ⁶	5.1	6.1	8	9
145(1)	x	x	-	x	-	-	x
145(2)	x	x	-	x	-	-	x
146	x	x ⁷	x	x ⁸	-	-	x ⁸
148(1)	-	x ⁷	x	-	-	-	-
148(2)	x ⁹	x ⁷	x	x ^{7,9}	-	-	x ^{7,9}
148(3)	x	x	x	x	x	x	x
150	x	x	x	x	x	x	x
152	x	x	x	x ⁷	-	-	x ¹⁰

Notes:

- 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 this Table 2.
- 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. A degree of protection in accordance with standards contained in the International Electrotechnical Commission publication 60079, 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.

Notes:

- 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 for the goods to be carried.
- ¹⁵ “FP” means flashpoint.
- ¹⁶ Under the provisions of the IMDG Code, stowage of class 5.2 dangerous goods under deck or in enclosed ro-ro spaces is prohibited.
- ¹⁷ Only applicable to dangerous goods evolving flammable vapour listed in the IMDG Code.
- ¹⁸ Only applicable to dangerous goods having a flashpoint less than 23°C listed in the IMDG Code.
- ¹⁹ Only applicable to dangerous goods having a subsidiary risk class 6.1.
- ²⁰ Under the provisions of the IMDG Code, stowage of class 2.3 having subsidiary risk class 2.1 under deck or in enclosed ro-ro spaces is prohibited.
- ²¹ Under the provisions of the IMDG Code, stowage of class 4.3 liquids having a flashpoint less than 23°C under deck or in enclosed ro-ro spaces is prohibited.

Carriage of dangerous goods - special requirements

144. Unless otherwise specified, the special requirements set out in Rules 145 to 154 shall govern the application of Tables 1, 2 and 3 to Rule 143 to both “on-deck” and “under-deck” stowage of dangerous goods where the relevant Rule numbers are indicated in the first column of the Tables.

Carriage of dangerous goods - water supplies

145. (1) Arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by permanent pressurisation or by suitably placed remote arrangements for the fire pumps.

(2) The quantity of water delivered in accordance with paragraph (1) shall be capable of supplying 4 nozzles of a size and at pressures as specified in Rules 76 to 88, 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.

(3) Means shall be provided for effectively cooling the designated underdeck cargo space by at least 5 litres/min per square metre of the horizontal area of cargo spaces, either by a fixed arrangement of spraying nozzles or flooding the cargo space with water. 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. The drainage system shall be sized to remove no less than 125 per cent of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Minister in the approval of the stability information.

(4) Provision to flood a designated under-deck cargo space with suitable specified media may be substituted for the requirements in paragraph (3).

(5) The total required capacity of the water supply shall satisfy paragraphs (2) and (3), if applicable, simultaneously calculated for the largest designated cargo space. The capacity requirements of paragraph (2) shall be met by the total capacity of the main fire pump(s), not including the capacity of the emergency fire pump, if fitted. If a drencher system is used to satisfy paragraph (3), the drencher pump shall also be taken into account in this total capacity calculation.

Carriage of dangerous goods – sources of ignition

146. Electrical equipment and wiring shall not be fitted in enclosed cargo spaces or vehicle spaces unless it is essential for operational purposes in the opinion of the Minister. If electrical equipment is fitted in such spaces, it shall be of a certified safe type in accordance with the recommendations of the

International Electrotechnical Commission for use in the dangerous environments to which it may be exposed unless it is possible to completely isolate the electrical system through such means as removal of links in the system, other than fuses. Cable penetrations of the decks and bulkheads shall be sealed against the passage of gas or vapour. Through runs of cables and cables within the cargo spaces shall be protected against damage from impact. Any other equipment, which may constitute a source of ignition of flammable vapour, shall not be permitted.

Carriage of dangerous goods – detection system

147. Ro-ro spaces shall be fitted with a fixed fire detection and fire alarm system complying with the requirements of the Fire Safety Systems Code. All other types of cargo spaces shall be fitted with either a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code. If a sample extraction smoke detection system is fitted, particular attention shall be made to paragraph 2.1.3 in Chapter 10 of the Fire Safety Systems Code in order to prevent the leakage of toxic fumes into occupied areas.

Carriage of dangerous goods – ventilation arrangement

148. (1) 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.

(2) 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.

(3) 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.

Carriage of dangerous goods – bilge pumping

149. (1) Where it is intended to carry flammable or toxic liquids in enclosed cargo spaces, the bilge pumping system shall be designed to protect against inadvertent pumping of such liquids through machinery space piping or pumps. Where large quantities of such liquids are carried, consideration shall be given to the provision of additional means of draining those cargo spaces.

(2) If the bilge drainage system is additional to the system served by pumps in the machinery space, the capacity of the system shall be not less than 10 m³/h per cargo space served. If the additional system is common, the capacity is not required to exceed 25 m³/h. The additional bilge system is not required to be arranged with redundancy.

(3) Whenever flammable or toxic liquids are carried, the bilge line into the machinery space shall be isolated either by fitting a blank flange or by a closed lockable valve.

(4) Enclosed spaces outside machinery spaces containing bilge pumps serving cargo spaces intended for carriage of flammable or toxic liquids shall be fitted with separate mechanical ventilation giving at least 6 air changes per hour. If the space has access from another enclosed space, the door shall be self-closing.

(5) If bilge drainage of cargo spaces is arranged by gravity drainage, the drainage shall be either led directly overboard or to a closed drain tank located outside the machinery spaces. The tank shall be provided with a vent pipe to a safe location on the open deck. Drainage from a cargo space into bilge wells in a lower space is only permitted if that space satisfies the same requirements as the cargo space above.

Carriage of dangerous goods – personnel protection

150. (1) Four sets of full protective clothing, resistant to chemical attack, shall be provided in addition to the fire-fighter's outfits required by Rule 106 and shall be selected taking into account the hazards associated with the chemicals being transported and the standards developed by the IMO according to the class and physical state. For solid bulk cargoes, the protective clothing shall satisfy the equipment provisions specified in the respective schedules of the IMSBC Code for the individual substances. For packaged goods, the protective clothing shall satisfy the equipment provisions specified in emergency procedures (EmS) of the Supplement to the IMDG Code for the individual substances. The protective clothing shall cover all skin, so that no part of the body is unprotected.

(2) At least two self-contained breathing apparatuses additional to those required by Rule 106 shall be provided. Two spare charges suitable for use with the breathing apparatus shall be provided for each required apparatus. A passenger ship carrying not more than 36 passengers and a cargo ship equipped with suitably located means for fully recharging the air cylinders free from contamination, is required to carry only one spare charge for each required apparatus.

Carriage of dangerous goods – portable fire extinguishers

151. Portable fire extinguishers with a total capacity of at least 12 kg of dry powder or equivalent shall be provided for the cargo spaces. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in these Rules.

Carriage of dangerous goods – insulation of machinery space boundaries

152. Bulkheads forming boundaries between cargo spaces and machinery spaces of category A shall be insulated to “A-60” class standard, unless the dangerous goods are stowed at least 3 m horizontally away from such bulkheads.

Other boundaries between such spaces shall be insulated to “A-60” class standard.

Carriage of dangerous goods – water spray system

153. (1) Each open ro-ro space having a deck above it and each space deemed to be a closed ro-ro space not capable of being sealed, shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform in the 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. The drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces.

(2) The drainage system shall be sized to remove no less than 125 per cent of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls.

- (3) (a) Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment.
- (b) In the event that it is not possible to comply with subparagraph (a), the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Minister in the approval of the stability information.

Carriage of dangerous goods – separation of ro-ro spaces

154. (1) In ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space and an adjacent open ro-ro 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 space is considered to be a closed cargo space over its entire length and shall fully comply with the relevant special requirements of Rules 143 to 154.

(2) In ships having ro-ro spaces, a separation shall be provided between a closed ro-ro space 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 spaces are in accordance with those required for the dangerous goods carried on adjacent weather decks.

Carriage of dangerous goods – document of compliance

155. The Minister shall provide the ship with an appropriate document as evidence of the compliance of construction and equipment with the requirements of Rules 143 to 154. Certification for dangerous goods, except solid dangerous goods in bulk, is not required for those cargoes specified as class 6.2 and 7 and dangerous goods in limited quantities and excepted quantities.

Closed ro-ro and vehicle spaces other than special category spaces for ships carrying more than 36 passengers 10 air changes per hour

Closed ro-ro and vehicle spaces other than special category spaces for ships carrying not more than 36 passengers; 6 air changes per hour

(b) in a cargo ship: 6 air changes per hour.

(2) The Minister may require an increased number of air changes when vehicles are being loaded and unloaded.

Protection of vehicle, special category and ro-ro spaces – performance of ventilation systems

158.(1)(a) Subject to subparagraph (b), in a passenger ship, the power ventilation system required in Rule 157 shall be separate from other ventilation systems and shall be in operation at all times when vehicles are in such spaces. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

(b) In a passenger ship constructed on or after 1 January 2017, the power ventilation system required in Rule 157 shall be separate from other ventilation systems and shall be operated to give at least the number of air changes required in Rule 157 at all times when vehicles are in such spaces, except where an air quality control system in accordance with paragraph (4) is provided. Ventilation ducts serving such cargo spaces capable of being effectively sealed shall be separated for each such space. The system shall be capable of being controlled from a position outside such spaces.

(2) (a) Subject to subparagraph (b), in a cargo ship, ventilation fans shall normally be run continuously whenever vehicles are on board. Where this is impracticable, the ventilation fans 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 the ro-ro or vehicle space 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 ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

(b) In a cargo ship constructed on or after 1 January 2017, ventilation fans shall normally be run continuously and give at least the number of air changes required in Rule 157 whenever vehicles

are on board, except where an air quality control system in accordance with paragraph (4) is provided. Where this is impracticable, the ventilation fans 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 the ro-ro or vehicle space 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 ro-ro or vehicle spaces shall be capable of being effectively sealed for each cargo space. The system shall be capable of being controlled from a position outside such spaces.

(3) The ventilation system referred to in paragraphs (1) and (2) shall be such as to prevent air stratification and the formation of air pockets.

(4) In all ships where an air quality control system is provided based on the IMO revised design guidelines and operational recommendations for ventilation systems in ro-ro cargo spaces in IMO Circular MSC.1/Circ.1515, the ventilation system may be operated at a decreased number of air changes and a decreased amount of ventilation. This relaxation does not apply to spaces to which at least 10 air changes per hour is required in accordance with Rule 159(2) and spaces to which Rules 148(1) and 163 apply.

(5) Means shall be provided on the navigation bridge of a ship to indicate any loss of the required ventilating capacity.

(6) Arrangements shall be provided to permit a rapid shutdown and effective closure of the ventilation system from outside of the space in case of fire, taking into account the weather and sea conditions.

(7) Ventilation ducts, including dampers, within a common horizontal zone shall be made of steel. In passenger ships, ventilation ducts that pass through other horizontal zones or machinery spaces shall be "A-60" class steel ducts constructed in accordance with Rule 69(2)(a) and (b) or Rule 69(6)(a) and (b), as appropriate having regard to the date of construction of the ship.

(8) Permanent openings in the side plating, the ends or deckhead of the space 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.

Protection of vehicle, special category and ro-ro spaces – electrical equipment and wiring

159. (1) Except as provided in paragraph (2), electrical equipment and wiring shall be of a type suitable for use in an explosive petrol and air mixture.

(2) Notwithstanding paragraph (1), in cases other than special category spaces below the bulkhead deck, above a height of 450 mm from the deck and from each platform for vehicles, if fitted, except platforms with openings of sufficient size permitting penetration of petrol gases downwards, electrical equipment of a type so enclosed and protected as to prevent the escape of sparks

shall be permitted as an alternative on condition that the ventilation system is so designed and operated as to provide continuous ventilation of the cargo spaces at the rate of at least 10 air changes per hour whenever vehicles are on board.

(3) 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.

(4) Other equipment that may constitute a source of ignition of flammable vapours shall not be permitted.

(5) Scuppers shall not be led to machinery or other spaces where sources of ignition may be present.

Protection of vehicle, special category and ro-ro spaces – detection and alarm

160. (1) Except as provided in paragraph (3), a fixed fire detection and fire alarm system shall be provided that complies with the requirements of the Fire Safety Systems Code. The fixed fire detection system 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. Following installation, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Minister.

(2) Except in open ro-ro spaces, open vehicle spaces and special category spaces, a sample extraction smoke detection system complying with the requirements of the Fire Safety Systems Code may be used as an alternative for the fixed fire detection and fire alarm system required in paragraph (1).

- (3) (a) An efficient fire patrol system shall be maintained in special category spaces.
- (b) If an efficient fire patrol system is maintained by a continuous fire watch at all times during the voyage, a fixed fire detection and fire alarm system is not required.
- (c) Manually operated call points shall be spaced so that no part of the space is more than 20 m from a manually operated call point, and a manually operated call point shall be placed close to each exit from such spaces.

Protection of vehicle, special category and ro-ro spaces – structural protection

161. Notwithstanding Rules 47 to 52, in passenger ships carrying more than 36 passengers, the boundary bulkheads and decks of special category spaces and ro-ro spaces shall be insulated to “A-60” class standard. Where a category (5), (9) and (10) space, as defined in Rules 49 and 50, is on one side of the division, the standard may be reduced to “A-0”. Where fuel oil tanks are below a special category space or a ro-ro space, the integrity of the deck between such spaces may be reduced to “A-0” standard.

Protection of vehicle, special category and ro-ro spaces – fire-extinction

162. (1) In a ship constructed before 1 July 2014:
- (a) vehicle spaces and ro-ro spaces that are not special category spaces and are capable of being sealed from a location outside of the cargo spaces shall be fitted with a fixed gas fire-extinguishing system which shall comply with the Fire Safety Systems Code, except that:
 - (i) if a carbon dioxide fire-extinguishing system is fitted, the quantity of gas available shall be at least 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 sealed, and the arrangements shall be such as to ensure that at least two thirds of the gas required for the relevant space shall be introduced within 10 minutes;
 - (ii) any other fixed inert gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided the Minister is satisfied that an equivalent protection is achieved; and
 - (iii) as an alternative, a fire-extinguishing system meeting the requirements of subparagraph (b) may be fitted;
 - (b) ro-ro and vehicle spaces not capable of being sealed, and special category spaces, shall be fitted with an approved fixed pressure water spraying system for manual operation which shall protect all parts of any deck and vehicle platform in such spaces. Such water spray systems shall have:
 - (i) a pressure gauge on the valve manifold;
 - (ii) clear marking on each manifold valve indicating the spaces served;
 - (iii) instructions for maintenance and operation located in the valve room; and
 - (iv) a sufficient number of drainage valves.
- (2) In a ship constructed on or after 1 July 2014:
- (a) vehicle spaces and ro-ro spaces that are not special category spaces and are capable of being sealed from a location outside of the cargo spaces shall be fitted with one of the following fixed fire-extinguishing systems:
 - (i) a fixed gas fire-extinguishing system complying with the Fire Safety Systems Code;
 - (ii) a fixed high-expansion foam fire-extinguishing system complying with the Fire Safety Systems Code; or
 - (iii) a fixed water-based fire-fighting system for ro-ro spaces and special category spaces complying with the Fire Safety Systems Code and subparagraph (b);

- (b) vehicle spaces and ro-ro spaces not capable of being sealed and special category spaces shall be fitted with a fixed water-based fire-fighting system for ro-ro spaces and special category spaces complying with the Fire Safety Systems Code which shall protect all parts of any deck and vehicle platform in such spaces. Such a water-based fire-fighting system shall have:
 - (i) a pressure gauge on the valve manifold;
 - (ii) clear marking on each manifold valve indicating the spaces served;
 - (iii) instructions for maintenance and operation located in the valve room; and
 - (iv) a sufficient number of drainage valves to ensure complete drainage of the system.

(3) The Minister may permit the use of any other fixed fire-extinguishing system that has been shown by a full-scale test in conditions simulating a flowing petrol fire in a vehicle space or a ro-ro space that it is not less effective in controlling fires likely to occur in such a space.

(4) In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks during the operation of the fixed pressure water-spraying system, when fixed pressure water-spraying systems are fitted the following arrangements shall apply:

- (a) in a passenger ship:
 - (i) in the spaces above the bulkhead deck, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard, and in the case of a ship constructed on or after 1 January 2010, shall take into account the IMO guidelines on Drainage of fire-fighting water from enclosed vehicle and ro-ro spaces and special category spaces for passenger and cargo ships in MSC.1/Circ.1234;
 - (ii) in a ro-ro passenger ship, discharge valves for scuppers, fitted with positive means of closing, operable from a position above the bulkhead deck in accordance with the requirements of the International Convention on Load Lines in force, shall be kept open while the ship is at sea;
 - (iii) any operation of valves referred to in clause (ii) shall be recorded in the log-book;
 - (iv) in the spaces below the bulkhead deck, the Minister may require pumping and drainage facilities to be provided additional to the requirements of Safety Convention regulation II-1/21, or in the case of a ship constructed on or after 1 January 2009, the requirements of Safety Convention regulation II-1/35-1. In such case, the drainage system shall be sized to remove no less than 125 per cent of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles, taking

into account the IMO guidelines on Drainage of fire-fighting water from enclosed vehicle and ro-ro spaces and special category spaces for passenger and cargo ships in MSC.1/Circ.1234. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment;

- (b) in a cargo ship, the drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. In such case, the drainage system shall be sized to remove no less than 125 per cent of the combined capacity of both the water spraying system pumps and the required number of fire hose nozzles and in the case of a ship constructed on or after 1 January 2010, taking into account the IMO guidelines on Drainage of fire-fighting water from enclosed vehicle and ro-ro spaces and special category spaces for passenger and cargo ships in MSC.1/Circ.1234. The drainage system valves shall be operable from outside the protected space at a position in the vicinity of the extinguishing system controls. Bilge wells shall be of sufficient holding capacity and shall be arranged at the side shell of the ship at a distance from each other of not more than 40 m in each watertight compartment. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account to the extent deemed necessary by the Minister in the approval of the stability information. Such information shall be included in the stability information supplied to the master as required by Safety Convention regulation II-1/22 or, in the case of a ship constructed on or after 1 January 2009, as required by Safety Convention regulation II-1/5-1.

(5) On all ships, for closed vehicles and ro-ro spaces and special category spaces, where fixed pressure water-spraying systems are fitted, means shall be provided to prevent the blockage of drainage arrangements, taking into account the IMO guidelines on Drainage of fire-fighting water from enclosed vehicle and ro-ro spaces and special category spaces for passenger and cargo ships in MSC.1/Circ.1234.

- (6) (a) Portable fire extinguishers shall be provided at each deck level in each hold or compartment where vehicles are carried, spaced not more than 20 m apart on both sides of the space. At least one portable fire-extinguisher shall be located at each access to such a cargo space.
- (b) In addition to the provisions of subparagraph (a), the following fire-extinguishing appliances shall be provided in vehicle, ro-ro and special category spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:
 - (i) at least 3 water-fog applicators; and

- (ii) one portable foam applicator unit complying with the provisions of the Fire Safety Systems Code, provided that at least 2 such units are available in the ship for use in such spaces.

Requirements for vehicle carriers carrying cargo including motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion

163. (1) In addition to complying with Rules 156 to 162, as appropriate,

- (a) vehicle carriers constructed on or after 1 January 2016 intended for the carriage of motor vehicles with compressed hydrogen or compressed natural gas in their tanks for their own propulsion as cargo shall comply with paragraphs (2) to (4) of this Rule, and
- (b) vehicle carriers constructed before 1 January 2016, shall comply with paragraph (4) of this Rule.

(2) The following requirements shall apply to spaces intended for the carriage of cargo consisting of motor vehicles with compressed natural gas in their tanks for their own propulsion:

- (a) all electrical equipment and wiring shall be of a certified safe type for use in an explosive methane and air mixture having regard to the recommendations of the International Electrotechnical Commission, in particular, publication IEC 60079;
- (b) electrical equipment and wiring, if installed in any ventilation duct, shall be of a certified safe type for use in explosive methane and air mixtures;
- (c) the fans shall be such as to avoid the possibility of ignition of methane and air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;
- (d) other equipment which may constitute a source of ignition of methane and air mixtures shall not be permitted.

(3) The following requirements shall apply to spaces intended for the carriage of cargo consisting of motor vehicles with compressed hydrogen in their tanks for their own propulsion:

- (a) all electrical equipment and wiring shall be of a certified safe type for use in an explosive hydrogen and air mixture having regard to the recommendations of the International Electrotechnical Commission, in particular publication IEC 60079;
- (b) electrical equipment and wiring, if installed in any ventilation duct, shall be of a certified safe type for use in explosive hydrogen 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;
- (c) the fans shall be designed such as to avoid the possibility of ignition of hydrogen and air mixtures. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;

- (d) other equipment which may constitute a source of ignition of hydrogen and air mixtures shall not be permitted.

(4) When a vehicle carrier carries as cargo one or more motor vehicles with either compressed hydrogen or compressed natural gas in their tanks for their own propulsion, at least two portable gas detectors shall be provided. Such detectors shall be suitable for the detection of the gas fuel and be of a certified safe type for use in the explosive gas and air mixture.

Casualty threshold, safe return to port and safe areas

The purpose of Rule 164 is to establish design criteria for a ship's safe return to port under its own propulsion after a casualty that does not exceed the casualty threshold stipulated in Rule 164(2) and to provide functional requirements and performance standards for safe areas.

164. (1) The provisions of this Rule apply to a passenger ship constructed on or after 1 July 2010 having a load line length of 120 m or greater or having 3 or more main vertical zones.

(2) For the purpose of this Rule, the casualty threshold, in the context of a fire, includes:

- (a) loss of space of origin up to the nearest "A" class boundaries, which may be a part of the space of origin, if the space of origin is protected by a fixed fire-extinguishing system; or
- (b) loss of the space of origin and adjacent spaces up to the nearest "A" class boundaries, which are not part of the space of origin.

(3) When fire damage does not exceed the casualty threshold indicated in paragraph (2), the ship shall be capable of returning to port while providing a safe area as defined in Rule 2. To be deemed capable of returning to port, the following systems shall remain operational in the remaining part of the ship not affected by fire:

- (a) propulsion;
- (b) steering systems and steering-control systems;
- (c) navigational systems;
- (d) systems for fill, transfer and service of fuel oil;
- (e) internal communication between the bridge, engineering spaces, safety centre, fire-fighting and damage control teams, and as required for passenger and crew notification and mustering;
- (f) external communication;
- (g) fire main system;
- (h) fixed fire-extinguishing systems;
- (i) fire and smoke detection system;
- (j) bilge and ballast system;
- (k) power-operated watertight and semi-watertight doors;

- (l) systems intended to support “safe areas” as indicated in paragraph (4)(b);
 - (m) flooding detection systems; and
 - (n) other systems determined by the Minister to be vital to damage control efforts.
- (4) The following functional requirements shall apply to a safe area:
- (a) the safe area(s) shall generally be internal space(s); however, the use of an external space as a safe area may be allowed by the Minister taking into account any restriction due to the area of operation and relevant expected environmental conditions;
 - (b) the safe area(s) shall provide all occupants with the following basic services, having regard to the Interim Explanatory Notes for the Assessment of Passenger Ship Systems’ Capabilities after a Fire or Flooding Casualty in MSC.1/Circ.1369/Add.1, to ensure that the health of passengers and crew is maintained:
 - (i) sanitation;
 - (ii) water;
 - (iii) food;
 - (iv) alternate space for medical care;
 - (v) shelter from the weather;
 - (vi) means of preventing heat stress and hypothermia;
 - (vii) light; and
 - (viii) ventilation;
 - (c) ventilation design shall reduce the risk that smoke and hot gases could affect the use of the safe area(s); and
 - (d) means of access to life-saving appliances shall be provided from each area identified or used as a safe area, taking into account that a main vertical zone may not be available for internal transit.

(5) An alternate space for medical care shall conform to a standard acceptable to the Minister having regard to the IMO Guidance on the establishment of medical and sanitation related programmes for passenger ships (MSC/Circ.1129).

Design criteria for systems to remain operational after a fire casualty

The purpose of Rule 165 is to provide design criteria for systems required to remain operational for supporting the orderly evacuation and abandonment of a ship, if the casualty threshold, as defined in Rule 164(2), is exceeded.

165. (1) This Rule applies to a passenger ship constructed on or after 1 July 2010 having a load line length of 120 m or greater or having 3 or more main vertical zones.

(2) In case any one main vertical zone in a passenger ship is unserviceable due to fire, the following systems shall be so arranged and segregated as to remain operational:

- (a) the fire main;
- (b) internal communications (in support of fire-fighting as required for passenger and crew notification and evacuation);
- (c) means of external communications;
- (d) bilge systems for removal of fire-fighting water;
- (e) lighting along escape routes, at assembly stations and at embarkation stations of life-saving appliances; and
- (f) guidance systems for evacuation shall be available.

(3) The systems listed in paragraph (2) shall be capable of operation for at least 3 hours based on the assumption of no damage outside the unserviceable main vertical zone. These systems are not required to remain operational within the unserviceable main vertical zones.

(4) Cabling and piping within a trunk constructed to an "A-60" standard shall be deemed to remain intact and serviceable while passing through the unserviceable main vertical zone for the purposes of paragraph (2). An equivalent degree of protection for cabling and piping may be approved by the Minister having regard to International Standards published by the International Electrotechnical Commission.

Safety centre on passenger ships

The purpose of Rule 166 is to provide a space to assist with the management of emergency situations.

166. (1) A passenger ship constructed on or after 1 July 2010 shall have on board a safety centre complying with the requirements of this Rule.

(2) The safety centre shall either be a part of the navigation bridge or be located in a separate space adjacent to and having direct access to the navigation bridge, so that the management of emergencies can be performed without distracting watch officers from their navigational duties.

(3) The layout and ergonomic design of the safety centre shall take into account guidelines developed by the IMO, as appropriate.

(4) A means of communication between the safety centre, the central control station, the navigation bridge, the engine control room, the storage room(s) for fire-extinguishing system(s) and fire equipment lockers shall be provided.

(5) Notwithstanding the requirements set out elsewhere in these Rules or the Safety Convention, the full functionality (operation, control, monitoring or any combination thereof, as required) of the safety systems listed in this paragraph shall be available from the safety centre:

- (a) all powered ventilation systems;
- (b) fire doors;

- (c) the general emergency alarm system;
- (d) the public address system;
- (e) electrically powered evacuation guidance systems;
- (f) watertight and semi-watertight doors;
- (g) indicators for shell doors, loading doors and other closing appliances;
- (h) water leakage of inner/outer bow doors, stern doors and any other shell door;
- (i) the television surveillance system;
- (j) the fire detection and alarm system;
- (k) fixed fire-fighting local application system(s);
- (l) sprinkler and equivalent systems;
- (m) water-based systems for machinery spaces;
- (n) the alarm to summon the crew;
- (o) the atrium smoke extraction system;
- (p) flooding detection systems; and
- (q) fire pumps and emergency fire pumps.

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 give 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. While these Rules apply primarily to ships constructed on or after 1 July 2002 which are engaged on international voyages, some provisions of the Rules apply to ships constructed before 1 July 2002, as set out in the Rules.

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.

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