
 STATUTORY INSTRUMENTS

1984 No. 1218

MERCHANT SHIPPING

SAFETY

The Merchant Shipping (Fire Protection) Regulations 1984

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The Secretary of State, after consultation with the persons referred to in section 22(2) of the Merchant Shipping Act 1979(a), in exercise of the powers conferred on him by sub-sections (1)(a), (3)(a), (c), (d), (f), (g), (h), (i), (j), (n), (o), (p) and (q), (4)(a), (5), (6)(a) and (b) of section 21 and by section 22(1) of that Act and of all other powers enabling him in that behalf, hereby makes the following Regulations:

(a) 1979 c.39.

PART I — PRELIMINARY

Citation, commencement, interpretation and application

1.—(1) These Regulations may be cited as the Merchant Shipping (Fire Protection) Regulations 1984 and shall come into operation on 1st September 1984.

(2) In these Regulations the following expressions have the following meanings respectively:

“ ‘A’ Class Division ” means a bulkhead or part of a deck which is:

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

“A-60” standard 60 minutes

“A-30” standard 30 minutes

“A-15” standard 15 minutes

“A-0” standard 0 minutes;

“Accommodation spaces” means:—

- (a) public spaces;
- (b) corridors and lobbies;
- (c) stairways;
- (d) lavatories;
- (e) cabins;
- (f) offices;
- (g) hospitals;
- (h) hairdressing salons;
- (i) pantries not containing cooking appliances;
- (j) lockers;
- (k) games and hobbies’ rooms;
- (l) spaces similar to any of the foregoing and trunks to such spaces allocated to passengers or crew;

“ ‘B’ Class Division ” means a bulkhead, part of a deck, ceiling or lining which is:—

- (a) so constructed as to be capable of preventing the passage of flame to the end of the first 30 minutes of the standard fire test;
- (b) so constructed as to provide an insulation standard such that, if the division is exposed to a standard fire test, the average temperature on the unexposed side of the division shall not increase more than 139°C

above the initial temperature, nor shall the temperature at any one point, including any joint, rise more than 225°C above the initial temperature within the time listed below:—

“B-15” standard 15 minutes

“B-0” standard 0 minutes; and

- (c) constructed of suitable non-combustible materials and all materials whose use is necessary for or ancillary to its construction and erection shall be non-combustible, with the exception that combustible veneers may be permitted provided that they meet the requirements of regulations 84, 100, 121 or 138 of these Regulations;

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

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

“Cargo area” means that part of the ship that contains cargo tanks, slop tanks and cargo pump rooms, cofferdams, ballast and void spaces adjacent to cargo tanks and also deck areas throughout the entire length and breadth of the part of the ship over such spaces;

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

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

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

“Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk” means a certificate in compliance with the requirements of the “Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk” or the “International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk”;

“Certificate of Fitness for the Carriage of Liquefied Gases in Bulk” means a certificate in compliance with the requirements of the “Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk” or the “International Code for the Construction and Equipment of Ships carrying Liquefied Gases in Bulk”;

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

1. Chapter 17 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk; or
2. Chapter VI of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk,
whichever is applicable;

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

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

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

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

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

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

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

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

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

(b) crude oil to which certain distillate fractions may have been added;

“Dangerous goods” means goods as defined in the Merchant Shipping (Dangerous Goods) Regulations 1981(a) and any reference to a particular class of dangerous goods is a reference to that class of dangerous goods as defined in those Regulations;

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

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

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

“Fishing vessel” has the same meaning as in section 9(1) of the Fishing Vessels (Safety Provisions) Act 1970(b);

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

1. Chapter 19 of the International Code for the Constuction and Equipment of Ships Carrying Liquefied Gases in Bulk;
2. Chapter XIX of the Code for the Construction and Equipment of Ships

(a) S.I. 1981/1747.

(b) 1970 c.27.

carrying Liquefied Gases in Bulk;

whichever is applicable;

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

“Guidelines for Inert Gas Systems” (MSC/Circ 353) forms part of the publication “Inert Gas Systems” 1983 edition published by the International Maritime Organization;

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

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

“International Maritime Dangerous Goods Code” (the IMDG Code) means the code of that name published by the International Maritime Organization; 1977 edition as amended by amendments numbers 1–20;

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

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

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

“Machinery space of Category A” means a machinery space which contains:

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

“Main vertical zones” means the main vertical zones into which the hull, superstructure and deck houses of a ship are divided in accordance with regulation 76 or 91 of these Regulations;

“Merchant Shipping Notice” means a Notice described as such and issued by the Department of Transport; and any reference to a particular Merchant Shipping Notice includes a reference to that Notice as amended or replaced from time to time by a subsequent Notice;

“New ship” means a ship the keel of which is laid or which is at a similar stage of construction on or after 1st September 1984; for the purpose of this definition “a similar stage construction” means the stage at which construction identifiable with a specific ship begins and assembly of that

ship has commenced comprising at least 50 tonnes or one per cent of the estimated mass of all structural materials whichever is less;

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

“Non-combustible material” means material which when heated to a temperature of 750°C neither flames for longer than 10 seconds duration, nor raises either its internal temperature or the temperature of the test furnace more than 50°C above 750°C when tested in accordance with British Standard Specification 476: Part 4: 1970, and the expression “combustible material” shall be construed accordingly;

“Oil-fired boiler” means any boiler wholly or partly fired by liquid fuel;

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

“Passenger ship” means a ship carrying more than 12 passengers;

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

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

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

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

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

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

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

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

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

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

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

At the end of the first	5 minutes	556°C
” ” ” ”	10 minutes	659°C
” ” ” ”	15 minutes	718°C
” ” ” ”	30 minutes	821°C
” ” ” ”	60 minutes	925°C

“Suitable” in relation to material means approved by the Secretary of State as suitable for the purpose for which it is used;

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

“Tanker” means a cargo ship constructed or adapted for the carriage in bulk of liquid cargoes of a flammable nature;

“Tons” means gross tons and a reference to tons:

- (a) in relation to a ship having alternative gross tonnages under paragraph 13 of Schedule 5 of the Merchant Shipping (Tonnage) Regulations 1982(a) is a reference to the larger of these tonnages; and
- (b) in relation to a ship having its tonnage determined both under Part II and regulation 16 of those regulations is a reference to its gross tonnage as determined under regulation 16 of those regulations;

“United Kingdom ship” means a ship as defined in section 21(2) of the Merchant Shipping Act 1979;

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

(a) S.I. 1982/841.

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

(3) Any reference in these Regulations to:—

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

shall include a reference to any document amending that publication which is considered by the Secretary of State to be relevant from time to time and is specified in a Merchant Shipping Notice.

(4) These Regulations shall apply to United Kingdom ships which are:

- (a) new ships;
- (b) newly converted passenger ships; and

to the extent that the Secretary of State deems reasonable and practical, to any major repairs, alterations and modifications to existing United Kingdom ships commencing on or after 1st September 1984; provided that any such repairs, alterations and modifications carried out pursuant to a contract entered into before 1st September 1984 shall be deemed to have commenced before that date;

provided that these Regulations shall not apply to:

- (i) pleasure craft which are not passenger ships and are of less than 13.7 metres in length;
- (ii) mechanically-propelled sea-going fishing vessels registered in the United Kingdom under Part I or entered in the fishing boat register under Part IV of the Merchant Shipping Act 1894(a).

Classification of ships

2.—(1) For the purpose of these Regulations the ships to which these regulations apply shall be arranged in the following classes:

(a) 1894 c.60.

Passenger ships

Class I. Passenger ships engaged on voyages (not being short international voyages) any of which are long international voyages.

Class II. Passenger ships engaged on voyages (not being long international voyages) any of which are short international voyages.

Class II(A). Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class II(A)" being a certificate for ships engaged on voyages of any kind other than international voyages.

Class III. Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class III" being a certificate for ships engaged only on voyages in the course of which they are at no time more than 70 miles by sea from their point of departure and not more than 18 miles from the coast of the United Kingdom, and which are at sea only in fine weather and during restricted periods.

Class IV. Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class IV" being a certificate for ships engaged only on voyages in partially smooth waters, or in smooth and partially smooth waters.

Class V. Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class V" being a certificate for ships engaged only on voyages in smooth waters.

Class VI. Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class VI" being a certificate for ships engaged only on voyages with not more than 250 passengers on board, to sea, in smooth or in partially smooth waters, in all cases in fine weather and during restricted periods in the course of which the ships are at no time more than 15 miles, exclusive of any smooth waters, from their point of departure nor more than 3 miles from land.

Class VI(A). Passenger ships in respect of which there is or should be in force a certificate entitled "Passenger Certificate Class VI(A)", being a certificate for ships carrying not more than 50 passengers for a distance of not more than 6 miles on voyages to or from isolated communities on the islands or coast of the United Kingdom and which do not proceed for a distance of more than 3 miles from land subject to any conditions which the Secretary of State may impose.

Ships other than passenger ships

Class VII. Ships (other than ships of Classes I: VII(T), VII(A), X, XI and XII) engaged on voyages any of which are long international voyages.

Class VII(A). Ships employed as fish processing or canning factory ships, and ships engaged in the carriage of persons employed in the fish processing or canning industries.

Class VII(T). Tankers engaged on voyages any of which are long international voyages.

Class VIII. Ships (other than ships of Classes I, VIII(T), IX, X, XI and XII) engaged on voyages (not being long international voyages) any of which are short international voyages.

Class VIII(A). Ships (other than ships of Classes II(A) to VI(A) inclusive, VIII(A)(T), IX, IX(A), X, XI and XII), engaged on voyages which are not international voyages.

Class VIII(T). Tankers engaged on voyages (not being long international voyages) any of which are short international voyages.

Class VIII(A)(T). Tankers engaged only on voyages which are not international voyages.

Class IX. Tugs and tenders (other than ships of Classes II, II(A), III, VI and VI(A)) which proceed to sea but are not engaged on long international voyages.

Class IX(A). Ships (other than ships of Classes IV to VI inclusive) which do not proceed to sea.

Class IX(A)(T). Tankers which do not proceed to sea.

Class X. Fishing vessels.

Class XI. Sailing ships (other than fishing boats and ships of Class XII which proceed to sea).

Class XII. Pleasure craft (other than ships of Classes I to VI(A) inclusive) of 13.7 metres in length or over.

(2) For the purposes of this regulation the following expressions have the following meanings respectively:

“Long international voyage” means an international voyage which is not a short international voyage within the meaning of the Merchant Shipping (Safety Convention) Act 1949(a);

“Partially smooth waters” means as respects any period specified in Schedule 2 to the Merchant Shipping (Smooth and Partially Smooth Waters) Rules 1977(b) the waters of any of the areas specified in column 3 of that Schedule in relation to that period;

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

(a) from 1st April to 31st October, both dates inclusive; and

(b) between one hour before sunrise and one hour after sunset in the case of ships fitted with navigation lights conforming to the collision regulations and between sunrise and sunset in the case of any other ships;

“Sea” does not include any partially smooth waters;

“Smooth waters” means any waters not being the sea or partially smooth waters, and in particular, means waters of any of the areas specified in column 2 of Schedule 2 to the Merchant Shipping (Smooth and Partially Smooth Waters) Rules 1977;

“Voyage” includes an excursion.

(a) 1949 c.43.

(b) S.I. 1977/252, the relevant amending instrument is S.I. 1978/801.

PART II—FIRE PREVENTION AND FIRE APPLIANCES:

PASSENGER SHIPS

SHIPS OF CLASS I

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

3.—(1) Every ship of Class I shall be provided with appliances in accordance with this regulation whereby at least two jets of water as required by these Regulations, can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any store room and any part of any cargo space when empty.

(2) Every ship of Class I of 4,000 tons or over shall be provided with at least three fire pumps operated by power and every such ship of under 4,000 tons shall be provided with at least two such pumps. Each pump shall be capable of delivering at least one jet of water simultaneously from each of any two hydrants, hoses and nozzles provided in the ship and shall comply with the requirements of regulation 60 of these Regulations.

(3) (a) In every ship of Class I of 1,000 tons or over the arrangement of the sea connections pumps and the sources of power for operating them shall be such as will ensure that a fire in any one compartment will not put all the fire pumps out of action.

(b) If in any ship of Class I of less than 1,000 tons a fire in any one compartment could put all the fire pumps out of action there shall be provided, in a position outside the machinery spaces, an independently driven power operated emergency fire pump and its source of power and sea connection. Such pump shall be capable of producing at least one jet of water simultaneously from each of any two hydrants and hoses through nozzles which shall comply with regulation 62(4)(b) of these Regulations, while simultaneously maintaining a pressure of at least 2.1 bar (0.21 N/mm²) at any hydrant in the ship.

(4) (a) In every ship of Class I there shall be provided a fire main, water service pipes, hydrants, hoses and nozzles which shall be so arranged that they comply with the requirements of regulations 61 and 62 of these Regulations when all watertight door and all doors in main vertical zone bulkheads are closed.

(b) In every ship of Class I of 1,000 tons or over, the arrangement of fire pumps, fire mains and hydrants shall be such that at least one jet of water is immediately available from any one hydrant in an interior location. Arrangements shall also be made to ensure the continuation of the output of water by the automatic starting of a fire pump required by these Regulations.

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

(6) In every ship of Class I where in any machinery space of Category A, access is provided at a low level from an adjacent shaft tunnel, two hydrants

fitted with hoses and nozzles shall be provided external to, but near the entrance to, that machinery space. Where such access is not provided from a tunnel but is provided from another space or spaces there shall be provided in one of those spaces two hydrants fitted with hoses and nozzles near the entrance to the machinery space of Category A. Such provisions need not be made when the tunnel or adjacent spaces are not part of an escape route.

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

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

(9) In every ship of Class I at least three water fog applicators in addition to the nozzles required by these Regulations shall be provided in special category spaces.

Portable fire extinguishers in accommodation, cargo and service spaces

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

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

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

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

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

Fixed fire extinguishing systems in cargo spaces

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

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

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

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

(4) In every ship of Class I there shall be provided in each open ro/ro cargo space having a deck over and each space deemed to be a closed ro/ro cargo space not capable of being sealed, a fixed pressure water spraying system complying with Schedule 9 to these Regulations.

Special requirements for cargo space ventilation

6.—(1) In every ship of Class I there shall be provided:—

(a) in each special category space an effective power ventilation system sufficient to give at least 10 air changes per hour; the Secretary of State may require an increased number of air changes when vehicles are being loaded and unloaded;

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

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

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

(3) In each special category space the electrical equipment shall comply with the provisions of regulation 53(3) of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984(a) and in each cargo space, other than special category space, intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the electrical equipment shall comply with the provisions of regulation 53(5) of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984.

Machinery spaces of Category A

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

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

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

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

- (a) in each boiler room one or more foam fire extinguishers each of at least 135 litres capacity or carbon dioxide fire extinguishers each of at least 45 kilogrammes capacity placed in such positions as to be readily accessible in the event of fire and sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room and spaces containing any part of the oil fuel installation;
- (b) in each boiler room at least one portable foam applicator unit complying with Schedule 6 to these Regulations;
- (c) in each firing space and in each space which contains any part of any oil fuel installation at least two portable fire extinguishers suitable for extinguishing oil fires;
- (d) in each firing space a receptacle containing at least 0.3 cubic metre of sand or other dry material suitable for extinguishing oil fires together with a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.

(a) S.I. 1984/1216.

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

- (a) one or more foam fire extinguishers of at least 45 litres or carbon dioxide extinguishers of at least 16 kilogrammes capacity; the extinguishers shall be sited so as to be readily accessible in the event of fire and they shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other areas of high fire risk;
- (b) at least one portable foam applicator unit complying with the requirements of Schedule 6 to these Regulations;
- (c) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 metres walking distance from any position within the space: provided that there shall be not less than two such extinguishers; and
- (d) in passenger ships carrying more than 36 passengers each machinery space of Category A shall be provided with at least two suitable water fog applicators.

Machinery spaces containing steam turbines or enclosed steam engines

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

- (a) foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers each of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the pressure lubrication system and on to any part of the casings enclosing pressure lubricated parts of the turbine, engines or associated gearing and any other areas of high fire risk; provided that such extinguishers shall not be required if equivalent protection is provided in such spaces by a fixed fire extinguishing system fitted in compliance with regulation 7(1) of these Regulations;
- (b) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 metres walking distance, from any position within the space; provided that there shall be not less than two such extinguishers;
- (c) in addition, where such spaces are to be periodically unattended, either a fixed pressure water spraying system complying with the requirements of Schedule 8, or a fixed gas fire extinguishing system complying with the requirements of Schedule 10 to these Regulations shall be fitted.

Fire extinguishing appliances in other machinery spaces

9. In every ship of Class I where a fire hazard exists in any machinery space for which no specific provisions for fire extinguishing are required by regulations 7 or 8 of these Regulations there shall be provided in or adjacent to that space a sufficient number of portable fire extinguishers to ensure that at least one extinguisher is not more than 10 metres walking distance from any position within that space unless equivalent means of fire extinction are provided.

Fire patrol, detection and alarm systems

10.—(1) (a) In every ship of Class I an efficient patrol system shall be

maintained so that any outbreak of fire may be promptly detected. In special category spaces in which the patrol is not maintained by a continuous fire watch at all times during the voyage there shall be provided in that space a fixed fire detection and fire alarm system complying with Schedule 11 to these Regulations.

- (b) In every ship of Class I manually operated call points complying with the requirements of Schedule 11 to these Regulations shall be fitted throughout the accommodation, service and special category spaces which will enable the fire patrol to give an alarm immediately to the navigating bridge or fire control station. Such a manually operated call point shall be positioned adjacent to each exit from every special category space.
- (c) Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

(2) In every ship of Class I there shall be provided in any part of the ship which is not reasonably accessible to the fire patrol and in each cargo space (other than special category spaces) containing motor vehicles with fuel in their tanks for their own propulsion a fixed fire detection and fire alarm system complying with Schedule 11 to these Regulations or a sample extraction smoke detection system complying with the requirements of Schedule 12 to these Regulations.

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

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

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

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

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

Firemen's outfits

11.—(1) Every ship of Class I shall be provided with:—

- (a) two firemen's outfits and, in addition,

- (b) (i) two firemen's outfits for every 80 metres (or part thereof) of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths;
- (ii) every such outfit shall comply with the requirements of regulation 69 of these Regulations; two such outfits shall include breathing apparatus of the air-hose type and the remainder shall include breathing apparatus of the self-contained type provided that where the air-hose of an air-hose type breathing apparatus has, in order to comply with paragraph (1) of Schedule 5, to exceed 36 metres in length a self-contained breathing apparatus shall be provided either in addition to or as a substitute for that air-hose type breathing apparatus.
- (2) Two such firemen's outfits shall be available at any one storage position.
- (3) In every ship of Class I carrying more than 36 passengers for each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.

International shore connection

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

SHIPS OF CLASS II

13. Regulations 3 to 12 inclusive of these Regulations shall apply to ships of Class II as they apply to ships of Class I.

SHIPS OF CLASS II(A) OF 21.34 METRES IN LENGTH OR OVER

14. Regulation 3 to 12 inclusive of these Regulations shall apply to ships of Class IIA of 21.34 metres in length or over as they apply to ships of Class I.

SHIPS OF CLASS II(A) OF LESS THAN 21.34 METRES IN LENGTH

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

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

Portable fire extinguishers

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

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

17.—(1) In every ship of Class II(A) of less than 21.34 metres in length there shall be provided in any space containing any oil-fired boiler, oil fuel settling tank or oil fuel unit, one or more foam fire extinguishers each of at least 45 litres capacity or carbon dioxide extinguishers each of at least 16 kilogrammes capacity. The extinguisher, or extinguishers, shall be sited so as to be readily accessible in the event of a fire and they shall be sufficient in number to enable foam or carbon dioxide to be directed on to any part of the boiler room or space containing any part of the oil fuel installation. In addition there shall be provided:—

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

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

SHIPS OF CLASS III OF 21.34 METRES IN LENGTH OR OVER*Fire pumps, fire main, water service pipes, hydrants, hoses and nozzles*

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

(2) Every such ship shall be provided with at least one fire pump operated by power. Each such pump shall be capable of delivering at least one jet of water from any fire hydrant, hose and nozzle provided in the ship and shall comply with the requirements of regulation 61 of these Regulations.

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

(4) Every such ship shall be provided with a fire main, water service pipes, hydrants, hoses and nozzles which shall comply with the requirements of regulations 61 and 62 of these Regulations.

(5) Every such ship shall be provided with at least one fire hose for every hydrant fitted in compliance with these Regulations.

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

Portable fire extinguishers

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

Machinery spaces of Category A

20.—(1) In every ship of Class III of 21.34 metres in length or over there shall be provided for the protection of any machinery space of Category A at least one of the fixed fire extinguishing installations required by regulation 7(1) of these Regulations.

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

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

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

- (a) one foam fire extinguisher of at least 45 litres capacity or a carbon dioxide fire extinguisher of at least 16 kilogrammes capacity; and

- (b) portable fire extinguishers suitable for extinguishing oil fires, so located that an extinguisher is not more than 10 metres walking distance from any point in the space, but in no event less than two such extinguishers.

Firemen's outfits

21. Every ship of Class III shall carry one fireman's outfit for each 30.5 metres (or part thereof) of the registered length of the ship. Every such outfit shall comply with the requirements of regulation 69 of these Regulations.

SHIPS OF CLASS III OF LESS THAN 21.34 METRES IN LENGTH

22. Regulations 15 to 17 inclusive of these Regulations shall apply to ships of Class III of less than 21.34 metres in length as they apply to ships of Class II(A) of less than 21.34 metres in length.

SHIPS OF CLASS IV OF 21.34 METRES IN LENGTH OR OVER

23. Regulations 18, 19 and 20 of these Regulations shall apply to ships of Class IV of 21.34 metres in length or over as they apply to ships of Class III of 21.34 metres in length or over.

SHIPS OF CLASS IV OF LESS THAN 21.34 METRES IN LENGTH

24. Regulations 15 to 17 inclusive of these Regulations apply to ships of Class IV of less than 21.34 metres in length as they apply to ships of Class II(A) of less than 21.34 metres in length.

SHIPS OF CLASS V

FULLY-DECKED SHIPS

25.—(1) Regulation 23 of these Regulations shall apply to fully-decked ships of Class V of 21.34 metres in length or over as it applies to ships of Class IV of 21.34 metres in length or over.

(2) Regulations 15 to 17 inclusive of these Regulations shall apply to fully-decked ships of Class V of less than 21.34 metres in length as they apply to ships of Class II(A) of less than 21.34 metres in length.

SHIPS NOT FULLY-DECKED

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

- (a) a receptacle containing an adequate quantity of sand or other dry material suitable for extinguishing oil fires;
- (b) a scoop for distributing the contents of the receptacle; and

- (c) the number of portable foam fire extinguishers shown in the following table:

Length of ship	Number of foam extinguishers
Not over 9.14 metres	2
Over 9.14 metres but not over 15.24 metres	3
Over 15.24 metres	5

- (d) in the case of any ship of 12.20 metres in length or over, two fire buckets, and, in the case of any ship of less than 12.20 metres in length, one fire bucket, unless the equipment required by paragraph (2) of this regulation is provided.

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

SHIPS OF CLASSES VI AND VI(A)

FULLY-DECKED SHIPS

27.—(1) Regulation 23 shall apply to fully-decked ships of Classes VI and VI(A) of 21.34 metres in length or over as it applies to ships of Class IV of 21.34 metres in length or over.

(2) Regulations 15 to 17 inclusive of these Regulations shall apply to fully-decked ships of Classes VI and VI(A) of less than 21.34 metres in length as they apply to ships of Class II(A) of less than 21.34 metres in length.

SHIPS NOT FULLY-DECKED

28. Regulation 26 of these Regulations shall apply to ships of Classes VI and VI(A) which are not fully-decked as it applies to ships of Class V which are not fully-decked.

PART III — FIRE PREVENTION AND FIRE APPLIANCES: SHIPS OTHER THAN PASSENGER SHIPS AND TANKERS

SHIPS OF CLASS VII OF 500 TONS OR OVER

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

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

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- (2)(a) Every ship of Class VII of 1,000 tons or over shall be provided with at least two fire pumps operated by power. Each such pump shall be capable of delivering at least one jet of water simultaneously from each of any two fire hydrants, hoses and nozzles provided in the ship and shall comply with the requirements of regulation 60 of these Regulations.
- (b) Every ship of Class VII of 500 tons or over but under 1,000 tons shall be provided with at least one fire pump operated by power, which shall be capable of delivering at least one jet of water simultaneously from each of any two fire hydrants, hoses and nozzles provided in the ship and shall comply with the requirements of regulation 60 of these Regulations, provided that the capacity of the fire pump shall not be less than 25 cubic metres per hour.
- (c) In every ship of Class VII of 500 tons or over, in addition to the fire pumps required by this regulation one of the other pumps fitted in the machinery space such as the general service, bilge and ballast pump shall be capable of providing water to the fire main at the capacity and pressure of the fire pumps.
- (3)(a) If, in any ship of Class VII of 500 tons or over, a fire in any one compartment could put all the fire pumps out of action there shall be provided, in a position outside the machinery spaces, an independently driven power operated emergency fire pump and its source of power and sea connection.
- (b) In every ship of Class VII of 2,000 tons or over the emergency fire pump shall meet the requirements of regulations 60(10) of these Regulations.
- (c) In every ship of Class VII of 500 tons or over but under 2,000 tons, the emergency fire pump shall be capable of delivering at least one jet of water simultaneously from each of any two hydrants and hoses through nozzles which shall comply with regulation 62(4)(b) of these Regulations whilst maintaining a pressure of at least 2.1 bar at any hydrant in the ship, provided that for such ships of 1,000 tons or over, the pressure at any hydrant shall not be less than 2.5 bar.
- (4)(a) In every ship of Class VII of 500 tons or over there shall be provided a fire main, water service pipes, hydrants, hoses and nozzles which shall comply with the requirements of regulations 61 and 62 of these Regulations.
- (b)(i) Every such ship of 1,000 tons or over shall, in addition to any fire hoses provided in the machinery spaces, be provided with at least one fire hose for each 30 metres (or part thereof) length of the ship but in no case less than five hoses and such hoses shall have a total length of at least 60 per cent of the length of the ship. In addition to such hoses there shall be provided one spare fire hose.
- (ii) In every such ship of 500 tons or over there shall be provided in ro/ro cargo spaces at least three water fog applicators in addition to the nozzles required by these regulations.
- (iii) In every such ship of 500 tons or over in every ro/ro cargo space the number of hydrants with hoses shall be so arranged that at least two jets of water each from a single length of hose not emanating from the same hydrant may reach any part of the space. Such hydrants shall

be positioned near the accesses to the protected space.

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

Portable fire extinguishers

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

(2) In every such ship there shall be provided in each ro/ro cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion:

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

Fixed fire extinguishing arrangements in cargo spaces

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

- (a) a fixed gas fire extinguishing system complying with the requirements of Schedule 10 to these Regulations for every cargo space (other than ro/ro cargo spaces not capable of being sealed); and
 - (b) a fixed pressure water spraying system complying with the requirements of Schedule 9 to these Regulations for every ro/ro cargo space not capable of being sealed.
- (2) (a) In every ship of Class VII of 2,000 tons or over other than ships to which paragraph (1) of this regulation applies, there shall be provided a fixed gas fire extinguishing system complying with the requirements of Schedule 10 to these Regulations for every cargo space.
- (b) The Secretary of State may exempt any ship from the requirements of paragraph (2)(a) of this regulation if:

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

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

(4) In every ship of Class VII of 500 tons or over there shall be provided for every ro/ro cargo space not capable of being sealed a fixed pressure water spraying system complying with Schedule 9 to these Regulations.

Special requirements for cargo space ventilation

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

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

(2) In every ship of Class VII of 500 tons or over in each closed ro/ro cargo space carrying motor vehicles with fuel in their tanks for their own propulsion and each cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion, the electrical equipment of such spaces shall

comply with the provisions of regulations 50(1) to 50(4) inclusive of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984(a).

Machinery spaces of Category A

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

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

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

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

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

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

- (a) one or more foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other areas of high fire risk;

- (b) at least one portable foam applicator unit complying with the requirements of Schedule 6 to these Regulations;
- (c) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 metres walking distance from any position within the space; provided that there shall be not less than two extinguishers.

Machinery spaces containing steam turbines or enclosed steam engines

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

- (a) foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers each of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the pressure lubrication system and on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing and any other areas of high fire risk; provided that such extinguishers shall not be required if equivalent protection is provided in such spaces by a fixed fire extinguishing system fitted in compliance with regulation 33(1) of these Regulations;
- (b) portable fire extinguishers suitable for extinguishing oil fires sufficient in number to ensure that at least one extinguisher is not more than 10 metres walking distance from any position within the space provided that there shall be not less than two extinguishers; and
- (c) where such spaces are to be periodically unattended there shall be provided additionally either a fixed pressure water spraying system complying with the requirements of Schedule 8 or a fixed gas fire extinguishing system complying with the requirements of Schedule 10 to these Regulations.

Fire extinguishing appliances in other machinery spaces

35. Where a fire hazard exists in any machinery space for which no specific provisions for fire extinguishing are made in regulations 33 and 34 of these Regulations there shall be provided in, or adjacent to that space sufficient number of portable fire extinguishers to ensure that at least one extinguisher is not more than 10 metres walking distance from any position within that space unless equivalent means of fire extinction are provided.

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

36.— (1) Every ship of Class VII of 500 tons or over shall be provided with a fixed fire detection and fire alarm system complying with the requirements of Schedule 11 to these Regulations in any machinery space where:

- (a) the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space; or
- (b) the main propulsion and associated machinery including sources of main electrical supply are provided with some automatic or remote control and are under continuous manned supervision from a control room.

(2) In every ship of Class VII of 500 tons or over there shall be provided in each ro/ro cargo space a fixed fire detection and fire alarm system complying with Schedule 11 to these Regulations.

(3) In every ship of Class VII of 500 tons or over there shall be provided in each cargo space (other than ro/ro cargo spaces) intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion either a fixed fire detection and fire alarm system complying with Schedule 11 or a sample extraction smoke detection system complying with Schedule 12 to these Regulations.

Firemen's outfits

37.—(1) Every ship of Class VII of 500 tons or over shall carry firemen's outfits which shall comply with the requirements of regulation 69 of these Regulations in accordance with the following scale:

Tonnage of the ship	Number of outfits
500 but under 2,500	2
2,500 but under 4,000	3
4,000 and over	4

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

International shore connection

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

SHIPS OF CLASS VII OF UNDER 500 TONS

39.—(1) This regulation applies to ships of Class VII of under 500 tons.

- (2) (a) Every such ship shall be provided with appliances in accordance with this regulation whereby at least one jet of water as required by these Regulations can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty.
- (b) Every such ship shall be provided with at least one fire pump operated by power which shall be capable of delivering at least one jet of water from any fire hydrant hose and nozzle provided in the ship, and which shall comply with the requirements of regulation 60 of these Regulations.
- (c) In every such ship fitted with oil-fired boilers or internal combustion type propulsion machinery there shall be provided in a position

outside the spaces containing such boilers or machinery an additional fire pump and its source of power and sea connection. If such a pump is operated by power it shall comply with the requirements of the preceding sub-paragraph and if it is manually operated it shall be provided with a hose and a 10 millimetre diameter nozzle through which it shall be capable of producing a jet of water having a throw of not less than 6 metres which can be directed on to any part of the ship.

- (d) In every such ship there shall be provided a fire main, water service pipes and hydrants which shall comply with the requirements of regulation 61 of these Regulations and at least three fire hoses and nozzles which shall comply with regulation 62 of these Regulations.

(3) Every such ship shall be provided with at least three portable fire extinguishers so situated as to be readily available for use in the accommodation and service spaces.

(4) In every ship to which this regulation applies there shall be provided for the protection of any space containing any oil-fired boiler, oil fuel settling tank or oil-fuel unit, at least one of the fire extinguishing systems referred to in regulation 33(1) of these Regulations.

(5) In addition to the requirements of paragraph (4) of this regulation there shall be provided:

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

(6) In every ship to which this regulation applies there shall be provided in any space containing internal combustion type machinery either:

- (a) one portable fire extinguisher suitable for extinguishing oil fires for each 74.6 kilowatts or part thereof of such machinery provided that no more than seven such extinguishers shall be required in any one space; or
- (b) two portable extinguishers suitable for extinguishing oil fires together with either:
- (i) one foam fire extinguisher of at least 45 litres capacity; or
- (ii) one carbon dioxide fire extinguisher of at least 16 kilogrammes capacity.

(7) Every ship to which this regulation applies shall be provided with at least one fireman's outfit which shall comply with the requirements of regulation 69 of these Regulations and which shall contain a breathing apparatus of the air-hose type.

SHIPS OF CLASS VII(A)

40.— (1) Regulations 29 to 38 inclusive of these Regulations shall apply to every ship of Class VII(A) of 500 tons or over which is employed as a fish processing or canning factory ship, or which is engaged in the carriage of persons engaged in the fish processing or canning industries, as they apply to ships of Class VII of 500 tons or over.

(2) Regulation 45 of these Regulations shall apply to ships of Class VII(A) other than those ships specified in paragraph (1) of this regulation as they apply to ships of Class X.

SHIPS OF CLASS VIII

SHIPS OF 500 TONS OR OVER

41. Regulations 29 to 38 inclusive of these Regulations shall apply to ships of Class VIII of 500 tons or over as they apply to ships of Class VII of 500 tons or over.

SHIPS OF 150 TONS OR OVER BUT UNDER 500 TONS

42. Regulation 39 shall apply to ships of Class VIII of 150 tons or over but under 500 tons as it applies to ships of Class VII of under 500 tons.

SHIPS OF UNDER 150 TONS

43.— (1) This regulation applies to ships of Class VII of under 150 tons.

(2) (a) Regulation 39(2) of these Regulations shall apply to every ship to which this regulation applies of 21.34 metres in length or over, as it applies to ships of Class VII of under 500 tons except that the fire pump required by regulation 39(2)(b) of these Regulations may be driven by the main engine.

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

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

Length of Ship	Minimum Number of Extinguishers or Buckets
Under 21.34 metres	2
21.34 metres or over	3

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

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

Length of Ship	Minimum Number of Extinguishers or Buckets
Under 6 metres	1
6 metres or over	2

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

(6) Every ship to which this regulation applies being a fully-decked ship of 21.34 metres in length or over shall be provided with a fireman's axe.

SHIPS OF CLASSES VIII(A), IX AND IX(A)

44.— (1) Regulations 41 to 43 inclusive of these Regulations shall apply to ships of classes VIII(A), IX and IX(A) as they apply to ships of Class VIII.

(2) The Secretary of State may exempt any ship of Classes VIII(A) and IX(A) and any ship of Class IX which is under 500 tons or which is not engaged on an international voyage from any of the requirements of these Regulations.

SHIPS OF CLASS X

45. Every ship of Class X shall carry fire appliances in accordance with the requirements appropriate to its length pursuant to Part IIIB of the Fishing Vessels (Safety Provisions) Rules 1975(a).

(a) S.I. 1975/330.

SHIPS OF CLASS XI

46.— (1) Regulations 41 to 43 inclusive of these Regulations shall apply to ships of Class XI as they apply to ships of Class VIII.

(2) The Secretary of State may exempt any ship of Class XI from any of the requirements of these Regulations.

SHIPS OF CLASS XII

47.— (1) Regulations 41 and 42 if these Regulations shall apply to ships of Class XII of 150 tons or over as they apply to ships of Class VIII of 150 tons or over.

- (2) (a) Every ship of Class XII of under 150 tons and of 21.34 metres in length or over, shall be provided with appliances in accordance with this regulation whereby at least one jet of water as required by these Regulations can reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated, and any store room and any part of any cargo space when empty;
- (b) every such ship shall be provided with at least one fire pump operated by power which may be driven by the main engine and which shall be capable of delivering at least one jet of water from any fire hydrant, hose and nozzle provided in the ship and which shall comply with the requirements of regulation 60 of these Regulations;
- (c) in every such ship fitted with oil-fired boilers or internal combustion type propulsion machinery, if the pump required by the preceding sub-paragraph and its source of power and sea connection are not situated outside spaces containing such boilers or machinery, there shall be provided in a position outside such spaces an additional fire pump and its source of power and sea connection. If such a pump is operated by power it shall comply with the requirements of the preceding sub-paragraph and if it manually operated it shall be provided with a hose and a 10 millimetre diameter nozzle through which it shall be capable of producing a jet of water having a throw of not less than 6 metres which can be directed on to any part of the ship.
- (d) in every such ship there shall be provided a fire main, water service pipes and hydrants which shall comply with the requirements of regulation 61 of these Regulations and at least two fire hoses.

(3) Every ship of Class XII of under 150 tons and of less than 21.34 metres in length shall be provided in a position outside the machinery spaces with either a power or a hand operated pump with a permanent sea connection, a hose with a nozzle at least 6 millimetres in diameter producing a jet of water having a throw of not less than 6 metres which can be directed on to any part of the ship, and in addition a spray nozzle suitable for use with the hose, provided that in any such ship of less than 15 metres in length and in any open ship of less than 21.34 metres in length, two fire buckets one of which shall be fitted with a lanyard may be substituted for such equipment but such buckets shall not be required in addition to buckets provided in compliance with paragraph (4) of this regulation.

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

Length of Ship	Minimum Number of Extinguishers or Buckets
Under 21.34 metres	2
21.34 metres or over	3

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

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

(6) Every ship of Class XII of under 150 tons being a fully decked ship of 21.34 metres in length or over shall be provided with a fireman's axe.

(7) The Secretary of State may exempt any ship of Class XII from any of the requirements of these Regulations.

PART IV—FIRE PREVENTION AND FIRE APPLIANCES: TANKERS

TANKERS OF CLASS VII(T) OF 500 TONS OR OVER

General requirements

48. Regulations 29 and 30(1), regulations 33 to 36(1) inclusive and regulation 38 of these Regulations shall apply to every tanker of Class VII(T) of 500 tons or over as they apply to ships of Class VII of 500 tons or over.

Cargo tank protection

49.— (1) Every tanker of Class VII(T) of 500 tons or over shall be provided with a fixed deck foam system complying with the requirements of Schedule 13 to these Regulations except that this requirement shall not apply to chemical tankers having a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk, nor to gas carriers having a valid Certificate of Fitness for the Carriage of Liquefied Gases in Bulk.

(2) Every tanker of Class VII(T) of 20,000 tonnes deadweight or over constructed or adapted and used to carry crude oil and petroleum products having a closed flash point not exceeding 60°C the Reid vapour pressure of which is below that of atmospheric pressure, and other liquids having a similar fire hazard, shall be provided with an inert gas system complying with the requirements of Schedule 14 to these Regulations except that in the case of a chemical tanker having a valid Certificate of Fitness for the Carriage of Dangerous Chemicals in Bulk or a gas carrier having a valid Certificate of Fitness for the Carriage of Liquefied Gases in Bulk alternative arrangements may be provided to the satisfaction of the Secretary of State.

(3) (a) Every inert gas system provided in accordance with this regulation shall be designed, constructed and tested to the satisfaction of the Secretary of State. It shall be designed and operated so as to render and keep the atmosphere of the cargo tanks including the slop tanks

non-flammable at all times, except where such tanks are to be gas free.

- (b) In the event that the inert gas system is unable to meet the operational requirement set out above and it has been assessed that it is impractical to effect a repair, then cargo discharge, deballasting and necessary tank cleaning may only be resumed when the “emergency procedures” laid down in the “Guidelines for Inert Gas Systems” are complied with.

(4) Combination carriers shall not carry solid cargoes unless all cargo tanks are empty of crude oil and other petroleum products having a closed flash point not exceeding 60°C and other liquids having a similar fire hazard and are gas freed or unless the arrangements provided in each case are to the satisfaction of the Secretary of State and in accordance with the relevant operational requirements contained in the “Guidelines for Inert Gas Systems”.

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

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

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

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

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

- (i) capable of preventing dangerous accumulation of explosive mixtures in intact cargo tanks during normal service throughout the ballast voyage and necessary in-tank operation; and
(ii) so designed as to minimise the risk of ignition from the generation of static electricity by the system itself;

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

- (i) capable of extinguishing spill fires and precludes ignition of spilled oil not yet ignited; and
(ii) capable of combating fires in ruptured tanks.

Cargo tank purging and/or gas freeing

50.— (1) In every tanker of Class VII(T) of 500 tons or over arrangements for purging and/or gas freeing shall be such as to minimize the hazards due to the

dispersal of flammable vapours in the atmosphere and to flammable mixtures in a cargo tank.

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

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

- (a) through the vent outlets as specified in regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984; or
- (b) with a vertical exit velocity of at least 20 metres per second through outlets at least 2 metres above the cargo tank deck level and through devices (other than flame screens) complying with Schedule 2 to the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984 so as to prevent the passage of flame into the cargo tanks. When the flammable vapour concentration in the outlet has been reduced to 30 per cent of the lower flammable limit the discharge of the vapour mixture may be at the cargo tank deck level.

Cargo Pump Rooms

51.— (1) Except as otherwise provided in paragraph (2) of this regulation, in every tanker of Class VII(T) of 500 tons or over, each cargo pump room and each pump room having a similar hazard shall be provided with at least one of the fixed fire extinguishing systems required by regulation 33(1) of these Regulations and which shall be operated from a readily accessible position outside the pump room, provided that where the fixed extinguishing system is a gas system:

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

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

Fireman isolating valves

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

Firemen's outfits

53. In every ship of Class VII(T) of 500 tons or over there shall be provided not less than four firemen's outfits complying with the requirements of regulation 69 of these Regulations.

TANKERS OF CLASS VII(T) OF UNDER 500 TONS

54.— (1) Regulation 39 of these Regulations shall apply to every tanker of Class VII(T) of under 500 tons as it applies to ships of Class VII of under 500 tons. In addition regulations 50 and 51 shall apply to such tankers as they apply to tankers of Class VII(T) of 500 tons or over.

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

TANKERS OF CLASS VIII(T)
TANKERS OF 500 TONS OR OVER

55. Regulations 48 to 53 inclusive of these Regulations shall apply to tankers of Class VIII(T) of 500 tons or over as they apply to tankers of Class VII(T) of 500 tons or over.

TANKERS OF 150 TONS OR OVER BUT UNDER 500 TONS

56. Regulation 42 of these Regulations shall apply to tankers of Class VIII(T) of 150 tons or over but under 500 tons as it applies to ships of Class VIII of 150 tons or over but under 500 tons. In addition regulations 50, 51 and 54(2) of these Regulations shall apply to tankers of Class VIII(T) as they apply to tankers of Class VII(T) of under 500 tons.

TANKERS OF UNDER 150 TONS

57. Regulation 43 of these regulations shall apply to tankers of Class VIII(T) of under 150 tons as it applies to ships of Class VIII of under 150 tons. In addition there shall be provided a mobile foam appliance in accordance with regulation 54(2) of these Regulations.

TANKERS OF CLASSES VIII(A)(T) AND IX(A)(T)

58.—(1) (a) Regulation 37 of these Regulations shall apply to tankers of Classes VIII(A)(T) and IX(A)(T) of 500 tons or over as it applies to ships of Class VII of 500 tons or over.

(b) Regulations 48 to 52 inclusive of these Regulations shall apply to tankers of Classes VIII(A)(T) and IX(A)(T) of 500 tons or over as they apply to tankers of Class VII(T) of 500 tons or over; provided

that tankers of Classes VIII(A)(T) and IX(A)(T) of less than 2,000 tons may instead of complying with regulation 49(1) comply with regulation 54(2).

(2) Regulations 56 and 57 inclusive of these Regulations shall apply to tankers of Classes VIII(A)(T) and IX(A)(T) as they apply to tankers of Class VIII(T).

(3) The Secretary of State may exempt any tanker of Classes VIII(A)(T) or IX(A)(T) which is under 500 tons or which is not engaged on an international voyage from any of the requirements of these Regulations.

PART V—FIRE PREVENTION AND FIRE APPLIANCES: GENERAL

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

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

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

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

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

Fire pumps

60.— (1) In every passenger ship to which these Regulations apply which is required by these Regulations to be provided with fire pumps operated by power, such fire pumps (other than any emergency fire pumps) shall together be capable of delivering for fire fighting purposes a quantity of water, under the conditions and at the pressure specified in regulation 61 of these Regulations of not less than two thirds of the quantity required to be dealt with by the bilge pumps provided in the ship in compliance with Part III of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984;

(2) In every ship, other than a passenger ship, to which these Regulations apply which is required by these Regulations to be provided with fire pumps operated by power such fire pumps (other than any emergency fire pump) shall together be capable of delivering for fire fighting purposes a quantity of water, under the conditions and at the pressure specified in regulation 61 of these Regulations, which shall not be less than the quantity obtained from the following formula;

Quantity of water in cubic metres per hour= Cd^2 where:

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

where

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

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

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

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

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

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

(5) In every ship to which these Regulations apply which is required by these Regulations to be provided with more than one fire pump operated by power (other than any emergency pump) every such fire pump shall have a capacity of not less than 80 per cent of the total capacity of the fire pumps required by paragraph (1) of this regulation divided by the number of fire pumps required by

these Regulations to be provided in the ship provided that each pump has a capacity of not less than 25 cubic metres per hour. When more fire pumps operated by power than are required by these Regulations are provided in any ship, the Secretary of State may permit the capacity of any such additional fire pumps to be less than 80 per cent.

(6) Every fire pump required by these Regulations which is operated by power (other than any emergency pump) shall be capable of producing from any fire hydrant or hydrants in the ship, at least the minimum number of jets of water required by these Regulations as appropriate to the class and tonnage of the ship, while maintaining the pressure required by regulation 61(2) of these Regulations.

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

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

(9) In every ship of Class I, II or II(A), any emergency fire pump shall be situated in a position aft of the ship's collision bulkhead.

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

- (a) The capacity of the emergency fire pump shall not be less than 40 per cent of the total capacity of the fire pumps required by this regulation and in any case not less than 25 cubic metres per hour whilst maintaining a minimum pressure of 2.5 bar (0.25N/mm²).
- (b) Any diesel driven power source for the emergency fire pump shall be capable of being readily started in its cold condition down to a temperature of 0°C by hand cranking. Where lower temperatures are likely to be encountered, heating arrangements acceptable to the Secretary of State shall be provided. Where hand cranking is impractical alternative arrangements shall be such as to enable the diesel driven power source to be started at least 6 times within a period of 30 minutes, and at least twice within the first 10 minutes.
- (c) Any service fuel tank for the diesel driven power source referred to in sub-paragraph (b) of this paragraph shall contain sufficient fuel to enable the emergency fire pump to run on full load for at least three hours and sufficient reserve of fuel shall be available outside the main machinery space to enable such pump to be run on full load for an additional 15 hours.
- (d) The total suction head of the emergency fire pump shall not exceed 4.5 metres under all conditions of list and trim likely to be encountered in service and the suction piping shall be designed to minimise suction losses.
- (e) The boundaries of the space containing the emergency fire pump shall be insulated to a standard of structural fire protection equivalent to that required for a control station in regulation 115 or regulation 132 of these Regulations.
- (f) Direct access shall not be permitted between the machinery space and the

space containing the emergency fire pump and its source of power except where the access is by means of an airlock, with each of the two doors being self-closing or through a watertight door capable of being operated from a space remote from the machinery space and the space containing the emergency fire pump and unlikely to be cut off in the event of fire in those spaces. In cases where such access by means of an airlock is provided, a second means of access to the space containing the emergency fire pump and its source of power shall be provided.

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

Firemain, water service pipes and hydrants

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

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

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

(2) Any fire pump required to be provided by these Regulations shall, when discharging the quantity of water required by paragraph (1) of this regulation through adjacent fire hydrants in any part of the ship from nozzles of sizes specified in regulation 62 of these Regulations, be capable of maintaining the following pressure at any hydrant:

- (a) in any passenger ship,
 - (i) of 4,000 tons and upwards:
 - 3.1 bar (0.31 N/mm²)
 - (ii) of 1,000 tons and upwards but under 4,000 tons:
 - 2.7 bar (0.27 N/mm²)
 - (iii) of under 1,000 tons:
 - 2.1 bar (0.21 N/mm²)
- (b) in any ship other than a passenger ship,
 - (i) of 6,000 tons and upwards:
 - 2.7 bar (0.27 N/mm²)
 - (ii) of 1,000 tons and upwards but under 6,000 tons:
 - 2.5 bar (0.25 N/mm²)
 - (iii) of under 1,000 tons:
 - 2.1 bar (0.2 N/mm²)

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

- (3) (a) Where any ship is required by these Regulations to be provided with appliances capable of producing two jets of water under the conditions required by these Regulations, hydrants sufficient in number shall be so positioned as to enable at least two jets of water, not emanating from the same hydrant, one of which shall be from a single length of hose, to reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and to any store room and any part of any cargo space when empty, except that in any special category space or ro/ro cargo space two jets shall reach any part of the space, each from a single length of hose. Such hydrants shall be positioned near the accesses to the protected spaces.
- (b) Where any ship is required by these Regulations to be provided with appliances capable of producing one jet of water under the conditions required by these Regulations, hydrants sufficient in number shall be so positioned as to enable one jet of water from a single length of hose to reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated and any store room and any part of any cargo space when empty.
- (4) (a) The fire main shall have no connections other than those necessary for fire fighting and washing down.
- (b) Materials readily rendered ineffective by heat shall not be used for fire mains unless adequately protected.
- (c) The fire hydrants shall be so placed that the fire hoses may be easily coupled to them.
- (d) In ships which may carry deck cargo the fire hydrants shall be so placed that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo.
- (e) Unless there is provided one fire hose and nozzle for each fire hydrant in the ship there shall be complete interchangeability of fire hose couplings and nozzles.
- (f) Hydrant valves of the screw lift type or cocks shall be fitted in such position that any of the fire hoses may be isolated and removed while the fire pumps are at work.
- (g) The water pipes shall not be made of cast iron, and if made of iron or steel shall be galvanised or alternatively the pipe wall thickness shall be increased by a corrosion allowance satisfactory to the Secretary of State.
- (h) The arrangements of pipes and hydrants shall be such as to avoid the possibility of freezing.
- (i) Isolating valves to separate the section of the fire main within the machinery space containing the main fire pump or pumps from the rest of the fire main shall be fitted in a position outside the machinery spaces which shall be easily accessible when there is a fire. The fire main shall be so arranged that when the isolating valves are shut all the hydrants on the ship, except those in the machinery space referred

to above, can be supplied with water by a fire pump not located in this machinery space through pipes which do not enter this space. Exceptionally, the Secretary of State may permit short lengths of the emergency fire pump suction and discharge piping to penetrate the machinery space if it is impracticable to route it externally, provided that the integrity of the fire main is maintained by the enclosure of the piping in a substantial steel casing.

Fire hoses, nozzles, etc.

62.— (1) Fire hoses provided in compliance with these Regulations shall not exceed 18 metres in length except that in ships having a moulded breadth of 27 metres or more, the length of fire hoses for exterior locations and for cargo spaces may exceed 18 metres but shall not exceed 27 metres in length. Such hoses shall be made of closely woven flax, canvas or other suitable material and shall be provided with couplings, branch pipes, other necessary fittings and nozzles, as required by these Regulations.

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

(3) Except in partially decked ships of Classes V, VI(A) and in ships of Classes X and XII, fire hoses provided in compliance with these Regulations shall not be used for any purpose other than for fire fighting or testing the fire appliances.

- (4) (a) Every ship which is required by these Regulations to be provided with fire pumps operated by power shall be provided with nozzles of 12 millimetres, 16 millimetres, 19 millimetres in diameter or as near thereto in diameter as possible. Nozzles larger in diameter may be provided if the requirements of these Regulations relating to the provision of water for fire fighting purposes are otherwise complied with.
- (b) For machinery spaces and exterior locations the diameter of the nozzles shall be such as to obtain the maximum possible discharge from the minimum number of jets of water and at the pressure required by these Regulations from the smallest fire pump permitted by regulation 60(5) of these Regulations, provided that the diameter of the nozzles shall not be required to be greater than 19 millimetres.
- (c) For accommodation and service spaces the diameter of the nozzles shall not be required to be greater than 12 millimetres.
- (d) Every nozzle provided in compliance with these Regulations shall be capable of producing a water spray and a plain water jet and shall incorporate a shut-off facility.

Location and arrangement of water pumps for other fire extinguishing systems

63. Pumps required for the provision of water for other fire extinguishing systems required by these Regulations, 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.

Special requirements for fixed fire extinguishing systems

64.— (1) Where halogenated hydrocarbon is used as an extinguishing medium in fixed fire extinguishing systems in accordance with these Regulations, its use shall be permitted only in machinery spaces, pump rooms and in cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo.

(2) Where a fixed pressure water spraying system is used for the protection of special category spaces, cargo spaces where permitted by these Regulations or ro/ro cargo spaces, special consideration shall be given to the bilge pumping and drainage arrangements where such spaces are below the bulkhead deck and to the scupper arrangements where such spaces are above the bulkhead deck.

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

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

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

Fixed fire extinguishing systems not required by these regulations

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

Fire extinguishers

67.— (1) Non-portable foam, carbon dioxide and dry powder fire extinguishers provided in compliance with these Regulations shall be of approved types and designs and shall meet the requirements of Schedules 2, 3 and 4 to these Regulations respectively.

(2) (a) Portable fire extinguishers (other than carbon dioxide or halogenated hydrocarbon fire extinguishers) provided in compliance with these Regulations shall, if they are a type discharging fluid, have a capacity of not more than 13.5 litres and not less than 9 litres.

(b) Portable carbon dioxide fire extinguishers provided in compliance

with these Regulations shall have a capacity of not less than 3 kilogrammes of carbon dioxide.

- (c) Portable dry powder fire extinguishers provided in compliance with these Regulations shall have a capacity of not less than 4.5 kilogrammes of dry powder.
- (d) Portable halogenated hydrocarbon fire extinguishers provided in compliance with these regulations shall have a capacity of not less than 7 kilogrammes of halogenated hydrocarbon.
- (e) Portable fire extinguishers of other types provided in compliance with these Regulations shall be of not less than the fire extinguishing equivalent of a 9 litre fluid fire extinguisher.

(3) Portable halogenated hydrocarbon fire extinguishers provided in compliance with these Regulations shall use either bromochlorodifluoromethane (B.C.F.)/(Halon 1211) or bromotrifluoromethane (B.T.M.)/(Halon 1301) as the extinguishing medium.

(4) Portable fire extinguishers provided in compliance with these Regulations for use in accommodation or service spaces of any ship shall so far as practicable have a uniform method of operation.

(5) Portable fire extinguishers provided in compliance with these Regulations shall subject to paragraphs (2), (3) and (4) of this regulation, be of an approved type and design and shall meet the requirements of British Standard BS 5423:1980.

(6) Portable and non portable fire extinguishers shall be periodically examined and subject to such tests as the Secretary of State may require.

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

(8) Portable carbon dioxide and halogenated hydrocarbon extinguishers shall not be located in accommodation spaces. Where such extinguishers are provided in compliance with these Regulations in radio rooms, at switchboards and other similar positions, the volume of any space containing one or more extinguishers shall be such as to limit the concentration of vapour that can occur due to discharge to not more than 5 per cent of the net volume of the space. For the purpose of this regulation the volume of carbon dioxide shall be calculated at 0.56 metres³/kilogramme, the volume of Halon 1301 at 0.16 metres³/kilogramme and the volume of Halon 1211 at 0.14 metres³/kilogramme.

(9) Where portable halogenated hydrocarbon extinguishers are provided in compliance with these Regulations in machinery spaces their number shall not exceed one half of the total number of extinguishers provided in such spaces.

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

(11) Fire extinguishers provided for use in any ship to which these Regulations apply shall not contain any extinguishing medium which has not been approved by the Secretary of State.

(12) For the purposes of these Regulations the capacity of a carbon dioxide or halogenated hydrocarbon extinguisher shall be taken to be the greatest weight of carbon dioxide or halogenated hydrocarbon respectively which it can safely contain in a tropical climate.

(13) For the purposes of these Regulations the capacity of any fire extinguisher, other than a carbon dioxide or halogenated hydrocarbon fire extinguisher, shall be taken to be the greatest volume or weight of extinguishing medium which it can contain when sufficient space is left to ensure the proper operation of the extinguisher.

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

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

Fire buckets

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

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

Firemen's outfits

69.— (1) Every fireman's outfit carried in compliance with the Regulations shall consist of:

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

(2) Firemen's outfits shall be stored in readily accessible positions which are not likely to be cut off in the event of fire and, except as provided for by regulation 11(2) of these Regulations, where more than one such outfit is provided, they shall be stored in widely separated positions.

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

70.— (1) In every ship to which these Regulations apply, there shall be provided:

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

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

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

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

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

Gaseous fuel for domestic purposes

71. Where gaseous fuel is used for domestic purposes the arrangements for storage, distribution and utilisation of the fuel shall be in accordance with regulation 55 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984.

Fire control plans

72.— (1) In every ship of Classes I and II and in every ship of Class II(A) of 21.34 metres in length or over there shall be permanently exhibited by the owner

of the ship for the guidance of the master and officers of the ship, general arrangement plans showing clearly for each deck the position of the control stations, the sections of the ship which are enclosed by "A" class divisions and the sections of the ship which are enclosed by "B" Class divisions together with particulars of the fire alarms, fire detection systems, the sprinkler installations, the fixed and portable fire extinguishing appliances and firemen's outfits, the means of access to the various compartments and decks in the ship, the ventilating system including particulars of the master fan controls, the position of dampers and identification numbers of the ventilating fans serving each section of the ship, the location of the international shore connection and the position of all means of control referred to in paragraph 70 of these Regulations. Descriptions in such plans shall be in English.

(2) In every ship of 500 tons or over, other than a ship of Class I or II or a ship of Class II(A) of 21.34 metres in length or over, there shall be permanently exhibited by the owner of the ship for the guidance of the master and officers of the ship general arrangement plans showing clearly in relation to the ship the information referred to in paragraph (1) of this regulation.

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

(4) A duplicate set of the general arrangement plans required by this regulation shall be permanently stored in a prominently marked weather-tight enclosure outside the deck house for the assistance of shore-side fire fighting personnel.

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

Availability of fire fighting appliances

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

PART VI—STRUCTURAL FIRE PROTECTION: PASSENGER SHIPS

SHIPS OF CLASSES I, II AND II(A) CARRYING MORE THAN 36 PASSENGERS

Application

74. Regulations 75 to 89 inclusive of this Part of these Regulations apply to passenger ships of Classes I, II and II(A) carrying more than 36 passengers.

Structure

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

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

- (a) the insulation of aluminium alloy components of “A” Class divisions or “B” Class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” Class division and 30 minutes duration in the case of a “B” Class division; and
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, shall be such that the temperature rise limitation specified in sub-paragraph (2)(a) of this regulation shall apply for 60 minutes duration.

Main vertical zones and horizontal zones

76.— (1) The hull, superstructure and deckhouses shall be subdivided by bulkheads consisting of “A” Class divisions into main vertical zones except in respect of special category spaces or ro/ro cargo spaces to which regulation 87 of these Regulations applies. The mean length of each zone on any one deck, above the bulkhead deck, shall not normally exceed 40 metres. Steps and recesses shall be kept to a minimum, but any which are necessary shall consist of “A” Class divisions. These divisions shall have insulation values in accordance with the tables at the end of regulation 78 of these Regulations.

(2) Any portions of such divisions which extend above the bulkhead deck shall, whenever possible, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck, and shall extend from deck to deck and to the ship’s shell and in the case of a deckhouse, to the external plating thereof.

(3) A main vertical zone may, for the purpose of regulation 86, be subdivided by horizontal “A” Class divisions into two or more parts provided that such horizontal divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall have insulation and integrity values in accordance with table 3 at the end of regulation 78 of these Regulations.

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

Bulkheads within a main vertical zone

77.— (1) Every bulkhead within the accommodation spaces or service spaces not being a bulkhead required by these Regulations to consist of an “A” Class division, shall consist of a “B” Class division or “C” Class division as required by the tables at the end of regulation 78 of these Regulations. All such divisions may be faced with combustible materials in accordance with regulation 84 of these Regulations.

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

- (a) when continuous “B” Class ceilings and/or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which in thickness and composition meets the requirements of “B” Class divisions, but which is required to meet “B” Class fire integrity standards only so far as is reasonable and practicable in the opinion of the Secretary of State; and
 - (b) in the case of a ship protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations the corridor bulkheads of “B” Class materials may terminate at a ceiling in the corridor, provided that such a ceiling is of material which in thickness and composition meets the requirements of “B” Class divisions; notwithstanding the requirements of regulation 78 of these Regulations, such bulkheads and ceilings shall be required to meet “B” Class fire integrity standards only so far as is reasonable and practicable in the opinion of the Secretary of State; all doors and their frames in such bulkheads shall be of non-combustible materials and shall be constructed and erected so as to provide substantial fire resistance to the satisfaction of the Secretary of State.
- (3) Every bulkhead required to be a “B” Class division, except a corridor bulkhead, shall extend from deck to deck and to the shell or other boundaries unless continuous “B” Class ceilings and/or linings are fitted on both sides of the bulkhead in which case the bulkhead may terminate at the continuous ceiling and/or lining.

Fire integrity of bulkheads and decks

78.—(1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of these Regulations, the minimum fire integrity and insulation standards of all bulkheads and decks shall be as prescribed in paragraphs (2) to (5) of this regulation and the tables at the end of this regulation.

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

(3) The following requirements shall govern application of the tables:—

- (a) table 1 shall apply to bulkheads bounding main vertical zones or horizontal zones;
table 2 shall apply to bulkheads not bounding either main vertical zones or horizontal zones;
table 3 shall apply to decks forming steps in main vertical zones or bounding horizontal zones;
table 4 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones; and
- (b) for the purpose of determining the appropriate fire integrity and insulation standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in Categories (1) to (14) below; where the contents and use of a space are such that there may be doubt as to its classification for the purpose of this regulation, it

shall be treated as a space within the relevant category having the most stringent boundary requirements; the number in parentheses preceding each category refers to the applicable column or row numbers in the tables:—

- (1) *control stations* and similar spaces are control stations as defined in regulation 1(2) of these Regulations;
spaces containing centralized emergency public address systems and equipment;
- (2) *stairways* include interior stairways, lifts and escalators and enclosures thereto (other than those wholly contained within machinery spaces) for passengers or crew; a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door;
- (3) *corridors* include passenger and crew space corridors and lobbies;
- (4) *lifeboat and liferaft handling and embarkation stations* include open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations;
- (5) *open deck spaces* include:
open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations;
the air space outside superstructures and deckhouses;
- (6) *accommodation spaces of minor fire risk* are:
cabins which are rooms containing furniture and furnishings of restricted fire risk as defined in regulation 1(2);
public spaces which are rooms containing furniture and furnishings of restricted fire risk as defined in regulation 1(2) and having a deck area of less than 50 square metres;
offices and dispensaries which are rooms containing furniture and furnishings of restricted fire risk as defined in regulation 1(2);
- (7) *accommodation and service spaces of moderate fire risk* are:
spaces listed in Category (6) but which are rooms containing furniture and furnishings of other than restricted fire risk;
public spaces which are rooms containing furniture and furnishings of restricted fire risk as defined in regulation 1(2) and having a deck area of 50 square metres or more;
lockers and store rooms within accommodation spaces having a deck area of less than 4 square metres in which no flammable liquids are stowed;
sale shops;
motion picture projection and film storage rooms;
laboratories in which no flammable liquids are stowed;
pharmacies;
drying rooms having a deck area of less than 4 square metres;
- (8) *accommodation spaces of greater fire risk* are:
public spaces which are rooms containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 square metres or more;
hairdressing salons and beauty parlours;

- (9) *sanitary and similar spaces* are:
communal sanitary facilities, showers, baths and water closets;
laundry rooms having a deck area of less than 6 square metres;
indoor swimming pool areas;
operating theatres;
pantries containing no cooking appliances and not annexed to galleys;
private sanitary facilities shall be considered part of the accommodation space in which they are located;
- (10) *tanks, voids and auxiliary machinery spaces having little or no fire risk* include:
water tanks forming part of the ship's structure;
voids and cofferdams;
auxiliary machinery spaces which do not contain machinery having a pressure lubricated system and where storage of combustibles is prohibited, such as:—
a ventilation and air-conditioning room; windlass room; steering gear room; stabilizer equipment room; electrical propulsion motor room; a room containing section switchboards and purely electrical equipment other than oil-filled electrical transformers (above 10 kVA); shaft and pipe tunnels; spaces for pumps and refrigeration machinery not using flammable liquids; closed trunks serving the spaces listed in this paragraph; other closed trunks such as pipe and cable trunks;
- (11) *auxiliary machinery spaces, cargo spaces, special category spaces, cargo and other oil tanks and other spaces of moderate fire risk* are:
cargo oil tanks;
cargo holds, ro/ro cargo spaces, trunkways and hatchways;
refrigerated chambers;
oil fuel tanks where installed in a separate space with no machinery;
shaft and pipe tunnels allowing storage of combustibles;
auxiliary machinery spaces specified in category (10) which contain machinery having a pressure lubricated system or where storage of combustibles is permitted;
oil fuel filling stations;
spaces containing oil-filled electrical transformers (above 10 kVA);
spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines of power output up to 110 kilowatts driving emergency generators, sprinkler pumps, drencher pumps or fire pumps, bilge pumps, etc;
special category spaces (tables 1 and 3 at the end of this regulation only apply);
closed trunks serving the auxiliary machinery spaces listed in this category;
- (12) *machinery spaces and galleys* are:
main propelling machinery rooms other than electrical propulsion motor rooms; 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;

- galleys and annexes;
pantries containing cooking appliances;
trunks and casings to the spaces listed in this category;
- (13) *store-rooms, workshops* and similar spaces are:
laundry rooms having a deck area of 6 square metres or more;
drying-rooms having a deck area of 4 square metres or more;
lockers and store rooms not containing flammable liquids, other than those within accommodation spaces having a deck area of less than 4 square metres;
mail and baggage rooms;
workshops not part of machinery spaces or galleys;
- (14) *spaces in which flammable liquids are stowed* include:
lamp rooms;
paint rooms;
store-rooms containing flammable liquids (including dyes, medicines, or potable spirits);
laboratories in which flammable liquids are stowed:
- (c) where a single value is shown for the fire integrity of a division between two spaces, that value shall apply in all cases;
- (d) in determining the applicable fire integrity standard of a division between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations or between such zones neither of which is so protected, the higher of the two values given in the tables set out in this regulation shall apply;
- (e) in determining the applicable fire integrity standard of a division between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations, or between such zones both of which are so protected, the lesser of the two values given in the tables set out in this regulation shall apply; where a main vertical zone or horizontal zone provided with a sprinkler system and a main vertical or horizontal zone not provided with such a system meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones;
- (f) where adjacent spaces are in the same numerical category and the superscription ^a appears in the tables set out at the end of this regulation, a bulkhead or deck between such spaces need not be fitted if in the opinion of the Secretary of State it is unnecessary;
- (g) where the superscription ^b appears in the tables set out at the end of this regulation, the lesser insulation value may be permitted but only if at least one of the adjoining spaces is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations;
- (h) where a dash appears in the tables set out at the end of this regulation, no special requirements for material or integrity of boundaries are required; and
- (i) the Secretary of State may, in respect of Category (5) spaces, permit lower

standards than the integrity values in tables 1 or 2, set out at the end of this regulation, for the ends of deckhouses and superstructures, and the integrity values in tables 3 or 4 for weather decks; the requirements of tables 1 to 4 in respect of Category (5) shall not necessitate enclosure of spaces which, in the opinion of the Secretary of State, need not be enclosed.

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

(5) The integrity of "A" Class divisions shall be maintained at the intersections and boundaries of such divisions.

TABLE 2 — BULKHEADS NOT BOUNDING EITHER MAIN VERTICAL ZONES OR HORIZONTAL ZONES

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

TABLE 3 — DECKS FORMING STEPS IN MAIN VERTICAL ZONES OR BOUNDING HORIZONTAL ZONES

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

Protection of stairways and lifts in accommodation and service spaces

79.— (1) All stairways shall be of steel frame construction, except where the Secretary of State may approve the use of other equivalent material, and shall be within enclosures formed of “A” Class divisions, except that:—

- (a) an isolated stairway connecting only two decks need not be enclosed on both decks provided that the integrity of the deck is maintained by bulkheads or doors at one between-deck space; when a stairway is closed at one between-deck space, the stairway enclosure shall have the same integrity standard as is required by the tables at the end of regulation 78 for the deck which separates the between-deck spaces; and
- (b) stairways may be fitted within the open part of a public space, provided that they lie wholly within such public space.

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

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

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

Openings in “A” Class divisions

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

(2) Where ventilation ducts pass through “A” Class divisions the requirements of regulation 82 shall apply.

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

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

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

(6) Every door in a division constructed in compliance with regulation 76(1) and 79(1) of these Regulations, except a watertight door or one which is normally

locked shut, shall be self-closing and capable of closing against an adverse inclination of up to $3\frac{1}{2}$ degrees. The speed of door closure shall be controlled so as to prevent undue danger to personnel. All such doors which are held in the open position shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system; except that this requirement shall not apply to a watertight door. Hold-back hooks, not subject to control station release, are not permitted.

(7) Where a space is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations, or fitted with a continuous "B" Class ceiling, the closing of openings in decks not forming steps in main vertical zones or bounding horizontal zones shall be reasonably tight and such decks shall meet the "A" Class integrity requirements in so far as is reasonable and practicable in the opinion of the Secretary of State.

(8) The requirements for "A" Class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, subject to the requirements of regulation 83. The requirements for "A" Class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening on to lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.

Openings in "B" Class divisions

81.—(1) Where a "B" Class division is pierced for the passage of electric cables, pipes, trunks, girders, beams or for other purposes the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (4) of this regulation. Where ventilation ducts pass through "B" Class divisions the requirements of regulation 82(11) shall apply.

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

(3) The requirements for "B" Class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles subject to the requirements of regulation 83. The requirements for "B" Class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening on to lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.

(4) Where an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations is fitted:—

- (a) the closing of openings in decks need only meet the “B” Class integrity requirements in so far as is reasonable and practicable;
- (b) openings in corridor bulkheads of “B” Class materials shall be protected in accordance with the provisions of regulation 77 of these Regulations.

Ventilation systems

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

(2) Where, of necessity, a ventilation duct passes through a main vertical zone bulkhead, a fail-safe automatic closing fire damper shall be fitted adjacent to the bulkhead. The damper shall also be capable of being manually closed from each side of the bulkhead. The operating position shall be readily accessible and marked in a red light-reflecting colour. The duct between the bulkhead and the damper shall be of steel or other equivalent material and be insulated to a standard to comply with paragraph (1) of regulation 80. The damper shall be fitted with a visible indicator at each operating position showing whether the damper is in the open or shut position.

(3) Where ventilation systems penetrate decks precautions shall be taken, in addition to those relating to the fire integrity of the decks required by paragraph (1) of regulation 80, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall be insulated as required by the tables at the end of regulation 78.

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

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

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

- (a) ducts not less than 0.075 square metre in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of sub-paragraph (c) and of paragraphs (8) and (9), ducts of less than 0.075 square metre in sectional area other than vertical ducts referred to in sub-paragraph (a) shall be constructed of non-combustible materials; where such ducts penetrate “A” Class divisions or “B” Class divisions the fire integrity of such divisions shall be maintained; and

- (c) ducts, not exceeding 0.02 square metre in sectional area nor 2 metres in length, need not be non-combustible provided that the following conditions are satisfied:—
- (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) the ducts are used only at the terminal ends of the ventilation system; and
 - (iii) the ducts are not located closer than 0.6 metre along their lengths to penetrations of “A” Class divisions or “B” Class divisions.

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

- (a) (i) constructed of steel having a thickness of at least 3 millimetres and 5 millimetres for ducts the widths or diameters of which are up to and including 300 millimetres and 760 millimetres and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 and 760 millimetres having a thickness to be obtained by interpolation; and
- (ii) suitably supported and stiffened; and
- (iii) fitted close to the boundaries penetrated with automatic fail-safe fire dampers, which are also capable of being closed manually; and
- (iv) insulated to “A-60” standard from the machinery space, galley, ro/ro cargo space or special category space to a point at least 5 metres beyond each fire damper; or
- (b) (i) constructed of steel in accordance with (a)(i) and (ii) of this paragraph; and
- (ii) insulated to “A-60” standard throughout the accommodation spaces, service spaces or control stations; except that penetrations of main zone bulkheads or decks shall comply with the requirements of regulation 80 of these Regulations.

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

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

of steel in accordance with sub-paragraphs (7)(a)(i) and (ii) of this regulation; and

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

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

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

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

In addition to complying with sub-paragraph (b) above, galley ventilation ducts shall also comply with paragraph (7) of this regulation.

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

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

(11) Where a ventilation duct of sectional area exceeding 0.02 square metre passes through a “B” Class division, the opening shall be lined with a steel sleeve of 900 millimetres in length unless the duct, where it passes through the division, is constructed of steel. One half of this length shall as far as possible be on each side of the division.

Windows and sidescuttles

83.—(1) All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which paragraph (8)

of regulation 80 and paragraph (3) of regulation 81 of these Regulations apply, shall be constructed so as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

(2) Notwithstanding the requirements of the tables set out at the end of regulation 78 of these Regulations the following shall apply:—

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

Restriction of combustible materials

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

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

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

- (a) the total volume of combustible facings, mouldings, decorations and veneers shall not exceed a volume equivalent to 2.5 millimetres of veneer on the combined area of walls and ceilings; in the case of ships fitted with an automatic sprinkler, fire alarm and fire detection system complying with the provisions of Schedule 7 to these Regulations the above volume may include some combustible material used for the erection of “C” Class divisions;
- (b) veneers used on surfaces and linings to which paragraph (1) applies shall not have a gross calorific potential exceeding 45 megajoules per square metre of surface area for the thickness used as measured in accordance with the method specified in International Standard ISO 1716-1973 (E), or with any International or British Standard replacing the same which the Secretary of State considers relevant from time to time and specifies in a Merchant Shipping Notice;
- (c) furniture in the corridors and stairway enclosures shall be kept to a minimum;
- (d) primary deck coverings shall be of approved material which which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures; and
- (e) waste paper receptacles shall be constructed of non-combustible materials and with solid sides and bottoms.

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

- (a) all ceilings, linings, draught stops and insulating materials shall be of non-combustible materials except in respect of:—
 - (i) mail rooms and baggage rooms;
 - (ii) materials used to insulate refrigerated compartments;
 - (iii) materials used to insulate valves associated with hot and cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded; and
 - (iv) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded; and
- (b) paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products.

Miscellaneous items of fire protection

85.— (1) The following provisions shall apply to all parts of the ship:—

- (a) any pipe which penetrates an “A” Class division or “B” Class division shall be of suitable material having regard to the temperature such divisions are required to withstand;
- (b) pipes intended for oil or other flammable liquids shall be of suitable material having regard to the risk of fire;
- (c) overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to a danger of flooding; and
- (d) in spaces where penetration of oil products is possible the exposed surface of insulation shall be impervious to oil or oil vapours.

(2) The following provisions shall apply to the accommodation spaces, service spaces, and control stations:—

- (a) every air space enclosed behind a ceiling, panel or lining, shall be divided longitudinally and transversely by close fitting draught stops which shall be spaced not more than 14 metres apart and shall be closed at each deck;
- (b) every ceiling and lining shall be so constructed as to enable a fire patrol to detect any smoke originating in a concealed or inaccessible space without impairing the efficiency of the fire protection of the ship; the Secretary of State may exempt any ship from the requirement of this regulation if he is satisfied that there is no risk of fire originating in such a space;
- (c) electric space heaters shall be fixed in position and shall be so constructed as to reduce risk of fire to a minimum; no such heater shall be fitted with an element so exposed that clothing, curtains or similar materials can be scorched or set on fire by heat from the element;
- (d) cellulose-nitrate film shall not be used for cinematograph installations.

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

86.—(1) In every ship there shall be installed in all accommodation spaces, service spaces and control stations throughout each separate main vertical zone or, if a main vertical zone is divided horizontally in accordance with regulation 76(3) into parts, throughout each part vertical zone either:—

- (a) an automatic sprinkler, fire detection and fire alarm system complying with the requirements specified in Schedule 7 to these Regulations and so arranged as to protect all such spaces in the ship; or
- (b) a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 to these Regulations and so arranged as to detect the presence or the signs of a fire and its location in any such spaces.

(2) The Secretary of State may exempt any ship from the requirements of this regulation in respect of:

- (a) any spaces which afford no substantial fire risk; or
- (b) any control station.

Protection of special category spaces and ro/ro cargo spaces

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

- (a) if it is not practicable to divide such spaces into main vertical zones, equivalent protection shall be obtained by dividing such spaces into horizontal zones; such a horizontal zone for the purpose of this regulation may include special category spaces or ro/ro cargo spaces on more than one deck provided that the overall height of the zone does not exceed 12 metres; the bulkheads and decks forming the boundaries of such a horizontal zone shall be insulated respectively as required for Category (1) spaces in tables 1 and 3 at the end of regulation 78 of these Regulations;
- (b) the requirements of regulations 80 and 82 of these Regulations for maintaining the integrity of vertical zones shall apply to bulkheads and decks forming the boundaries separating horizontal zones from each other and from the remainder of the ship;
- (c) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 to these Regulations shall be provided;
- (d) indicators shall be provided on the navigating bridge which shall show when any access fire door in the boundary of a special category space or ro/ro cargo space is closed; and
- (e) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition; ventilation ducts, including dampers, shall be of steel and arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire.

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

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

- (a) a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 or a sample extraction smoke detection system complying with Schedule 12 to these Regulations shall be provided;
- (b) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 or a fixed gas fire extinguishing system complying with the requirements specified in Schedule 10 to these Regulations shall be provided and
- (c) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition; ventilation ducts, including dampers, shall be of steel.

Special arrangements in machinery spaces

89. The following provisions shall apply to machinery spaces:—

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) doors in the boundaries of machinery spaces of Category A, other than watertight doors and the fire-screen door referred to in paragraph (d), shall be arranged so that the closure of the door will be assured in the event of fire in the space; and the doors shall be provided with closing arrangements which either comply with regulation 80(6) of these Regulations or are provided with power operated closing arrangements operable from the control position required by regulation 70(2) of these Regulations; and
- (d) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a lightweight steel fire-screen door in addition to any watertight door; the fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

**SHIPS OF CLASSES I, II AND 11(A) CARRYING NOT MORE
THAN 36 PASSENGERS**

Application

90. Regulations 91 to 105 inclusive of this Part of these Regulations apply to passenger ships of Classes I, II and II(A) carrying not more than 36 passengers.

Structure

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

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

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

Main vertical zones and horizontal zones

92.— (1) The hull, superstructure and deckhouses in the way of accommodation and service spaces shall be subdivided by bulkheads consisting of “A” Class divisions into main vertical zones. The mean length of each zone on any one deck above the bulkhead deck shall not exceed 40 metres. Steps and recesses shall be kept to a minimum, but any which are necessary shall consist of “A” Class divisions. These divisions shall have insulation values in accordance with the tables at the end of regulation 94, except that where insulation values of “B-0” and “C” appear in table 5 the value of “A-0” shall be substituted.

(2) Any portions of such divisions which extend above the bulkhead deck shall, whenever possible, be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck and shall extend from deck to deck and to the ship’s shell, and, in the case of a deckhouse, to the external plating thereof.

(3) A main vertical zone may, for the purpose of regulation 102, be sub-divided by horizontal “A” Class divisions into two or more parts provided that such horizontal divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in table 6 at the end of regulation 94 of these Regulations.

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

Bulkheads within a main vertical zone

93.— (1) Every bulkhead within the accommodation spaces or service spaces not being a bulkhead required by these Regulations to consist of an “A” Class division, shall consist of a “B” Class division or a “C” Class division as prescribed in the tables at the end of regulation 94. All such divisions may be faced with

combustible materials in accordance with the provisions of regulation 100 of these Regulations.

(2) All corridor bulkheads where not required to be "A" Class divisions, shall be "B" Class divisions, which shall extend from deck to deck except that:—

- (a) when continuous "B" Class ceilings and/or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of a material which in thickness and composition meets the requirements of "B" Class divisions, but which is required to meet "B" Class fire integrity standards only so far as is reasonable and practicable in the opinion of the Secretary of State; and
- (b) in the case of a ship protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations a corridor bulkhead of "B" Class integrity may terminate at a ceiling in the corridor, provided that such a ceiling is of a material which, in thickness and composition, is acceptable in the construction of "B" Class divisions; notwithstanding the requirements of regulation 94, such bulkheads and ceilings are required to meet "B" Class fire integrity standard only as far as is reasonable and practicable in the opinion of the Secretary of State; all doors and their frames in such bulkheads shall be of non-combustible materials and shall be constructed and erected so as to provide adequate fire resistance to the satisfaction of the Secretary of State.

(3) Every bulkhead required to be a "B" Class division, except a corridor bulkhead, shall extend from deck to deck and to the shell or other boundaries unless continuous "B" Class ceilings and/or linings are fitted on both sides of the bulkhead, in which case the bulkhead may terminate at the continuous ceiling and/or lining.

Fire integrity of bulkheads and decks

94.— (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks of these Regulations, the minimum fire integrity of bulkheads and decks shall be as prescribed in paragraphs (2) to (5) of this regulation and the tables at the end of this regulation.

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

(3) The following requirements shall govern application of the tables:—

- (a) tables 5 and 6 shall apply respectively to the bulkheads and decks separating adjacent spaces;
- (b) for the purpose of determining the appropriate fire integrity and insulation standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in Categories (1A) to (11A) below; the number in parentheses preceding each category refers to the applicable column or row numbers in the tables:—

(1A) *control stations* and similar spaces are:—

control stations as defined in regulation 1(2) of these Regulations; spaces containing centralised emergency public address systems and equipment:

(2A) *corridors* include passenger and crew space corridors and lobbies:

(3A) *accommodation spaces* are:

spaces as defined in regulation 1(2) of these Regulations but excluding stairways, corridors, lobbies:

(4A) *stairways* include interior stairways, lifts and escalators and enclosures thereto (other than those wholly contained within the machinery spaces); 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:

(5A) *service spaces of low risk* are lockers and storerooms having areas of less than 2 square metres, drying rooms and laundries:

(6A) *machinery spaces of category A*:

(7A) *other machinery spaces*:

(8A) *cargo spaces* as defined in regulation 1(2) and including trunkways and hatchways to such spaces, but excluding special category spaces and ro/ro cargo spaces:

(9A) *service spaces of high risk* are galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and storerooms having areas of 2 square metres or more and workshops other than those forming part of the machinery spaces:

(10A) *open decks* are:

open deck spaces, enclosed promenades having no fire risk, and the air space outside superstructures and deckhouses:

(11A) *special category spaces etc.* are: special category spaces and ro/ro cargo spaces as defined respectively in regulation 1(2) of these Regulations:

- (c) where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases;
- (d) in determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations or between such zones neither of which is so protected the higher of the two values given in the tables shall apply;
- (e) in determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply; where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the table shall apply to the division between the zones;

- (f) where adjacent spaces are of the same numerical category and superscription ^a is specified a bulkhead or deck of the rating shown in the tables is only required when such spaces are used for different purposes;
 - (g) bulkheads separating the wheelhouse and chartroom from each other may be “B-O” rating;
 - (h) for the application of paragraph (1) of regulation 92 of these Regulations “B-0” and “C” where appearing in table 5 shall be read as “A-O”;
 - (i) where an asterisk is specified in the tables, the division is required to be of steel or equivalent material but is not required to be of “A” Class standard; for the application of paragraph (1) of regulation 92 of these Regulations an asterisk where appearing in table 6, except Categories (8A) and (10A), shall be read as “A-O”.
- (4) Continuous “B” Class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.
- (5) The integrity of “A” Class divisions shall be maintained at intersections and boundaries.

TABLE 6 — FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

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

Protection of stairways and lifts in accommodation and service spaces

95.— (1) All stairways shall be of steel frame construction except where the Secretary of State may approve the use of other equivalent material, and shall be within enclosures formed of “A” Class divisions, except that:—

- (a) an isolated stairway connecting only two decks need not be enclosed on both decks provided that the integrity of the deck is maintained by bulkheads or doors at one between-deck space; when a stairway is closed at one between-deck space, the stairway enclosure shall have the same integrity standard as is required by table 6 at the end of regulation 94 for the deck which separates the between-deck spaces; and
 - (b) stairways may be fitted within the open part of a public space provided that they lie wholly within such public space.
- (2) Every opening in a stairway enclosure shall be provided with a means of closure which shall be permanently attached thereto.
- (3) Every stairway enclosure shall have direct communication with the corridors and be of sufficient area to prevent congestion having regard to the number of persons likely to use it in an emergency. In so far as practicable, stairway enclosures shall not give direct access to cabins, service lockers or other enclosed spaces containing combustibles in which a fire is likely to originate.
- (4) Every lift trunk shall be so fitted as to prevent the passage of smoke and flame from one between-deck to another and shall be provided with means of closing so as to permit the control of draught and smoke.

Openings in “A” Class divisions

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

(2) Where ventilation ducts pass through “A” Class divisions the requirements of regulation 98 shall apply.

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

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

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

(6) Every door, in a division constructed in compliance with regulation 92(1) and 95(1) of these Regulations, except a watertight door or one which is normally

locked shut, shall be self-closing and capable of closing against an adverse inclination of up to $3\frac{1}{2}$ degrees. The speed of door closure shall be controlled so as to prevent undue danger to personnel. All such doors which are held in the open position shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system, except that this requirement shall not apply to watertight doors. Hold-back hooks, not subject to control station release, are not permitted.

(7) Where a space is protected by an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations or fitted with a continuous "B" Class ceiling, the closing of openings in decks not forming steps in main vertical zones or bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "A" Class integrity requirements in so far as is reasonable and practicable in the opinion of the Secretary of State.

(8) The requirements for "A" Class integrity of other boundaries of a ship shall not apply to glass partitions, windows and sidescuttles, subject to the requirements of regulation 99. The requirements for "A" Class integrity shall not apply to exterior doors in superstructures and deckhouses, except that doors opening onto lifeboat and liferaft handling and embarkation areas shall be of such construction as to protect these areas from a space having a potential fire hazard.

Openings in "B" Class divisions

97.—(1) Where a "B" Class division is pierced for the passage of electric cables, pipes, trunks, girders, beams, or for other purposes, the arrangements shall be such that the effectiveness of the division in resisting fire is not thereby impaired except as provided in paragraph (5) of this regulation. Where ventilation ducts pass through "B" Class divisions the requirements of regulation 98(11) shall apply.

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

(3) The requirements for "B" Class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles subject to the requirements of regulation 99. Similarly, the requirements for "B" Class integrity shall not apply to exterior doors in superstructures and deckhouses.

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

(5) Where an automatic sprinkler, fire alarm and fire detection system complying with the provisions of Schedule 7 to these Regulations is fitted:

- (a) the closing of openings in decks need only meet the "B" Class integrity requirements in so far as is reasonable and practicable; and
- (b) openings in corridor bulkheads of "B" Class materials shall be protected in accordance with the provisions of regulation 93 of these Regulations.

Ventilation systems

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

(2) Where of necessity, a ventilation duct passes through a main vertical zone bulkhead, a fail-safe automatic closing fire damper shall be fitted adjacent to the bulkhead. The damper shall also be capable of being manually closed from each side of the bulkhead. The operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the bulkhead and the damper shall be of steel or other equivalent material and, if necessary, be insulated to a standard such as to comply with paragraph (1) of regulation 96. The damper shall be fitted with a visible indicator at each operating position showing whether the damper is in the open or shut position.

(3) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by paragraph (1) of regulation 96, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall be insulated as required by the tables at the end of regulation 94.

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

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

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

- (a) ducts not less than 0.075 square metre in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;
- (b) subject to the requirements of sub-paragraph (c) and of paragraphs (8) and (9), ducts of less than 0.075 square metre in sectional area other than vertical ducts referred to in sub-paragraph (a) shall be constructed of non-combustible materials; where such ducts penetrate "A" Class divisions or "B" Class divisions, due regard shall be given to ensuring the fire integrity of the divisions; and

- (c) ducts, not exceeding 0.02 square metre in sectional area nor 2 metres in length, need not be non-combustible provided that the following conditions are satisfied:
- (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) the ducts are used only at the terminal ends of the ventilation system; and
 - (iii) the ducts are not located closer than 0.6 metre along their lengths to penetrations of "A" Class divisions or "B" Class divisions.

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

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

except that penetrations of main zone bulkheads or decks shall comply with the requirements of regulation 96 of these Regulations.

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

- (a)
 - (i) the ducts where they pass through a machinery space of Category A, galley, ro/ro cargo space or special category space are constructed of steel in accordance with sub-paragraphs (7)(a)(i) and (ii) of this regulation; and
 - (ii) automatic fail-safe fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated; and
 - (iii) the integrity of the boundaries of the machinery space, galley, ro/ro cargo space or special category space is maintained at the penetrations; or
- (b)
 - (i) the ducts where they pass through a machinery space of Category A, galley, ro/ro cargo space or special category space are constructed of steel in accordance with sub-paragraphs (8)(a)(i) and (ii) of this

regulation; and

- (ii) the ducts are insulated to “A-60” standard within the machinery space, galley, ro/ro cargo space, or special category space; except that penetrations of main zone bulkheads and decks shall comply with paragraph (2) of this regulation.

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

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

In addition to complying with sub-paragraph (b) above, galley ventilation ducts shall also comply with paragraph (7) of this regulation.

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

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

(11) Where a ventilation duct of sectional area exceeding 0.02 square metre passes through a “B” Class division, the opening shall be lined with a steel sleeve of 900 millimetres in length unless the duct where it passes through the division is constructed of steel. One half of this length shall as far as possible be on each side of the division.

Windows and sidescuttles

99.—(1) All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations other than those to which paragraph (8)

of regulation 96 and paragraph (3) of regulation 97 of these Regulations apply, shall be constructed so as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

(2) Notwithstanding the requirements of the Tables at the end of regulation 93 of these Regulations:—

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

Restriction of combustible materials

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

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

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

- (a) the total volume of combustible facings, mouldings, decorations and veneers shall not exceed a volume equivalent to 2.5 millimetres of veneer on the combined area of walls and ceilings; in the case of ships fitted with an automatic sprinkler, fire detection and fire alarm system complying with the provisions of Schedule 7 to these Regulations the above volume may include some combustible material used for the erection of “C” Class divisions;
- (b) veneers used on surfaces and linings to which Paragraph (1) applies shall not have a gross calorific potential exceeding 45 megajoules per square metre of surface area for the thickness used as measured in accordance with the method specified in International Standard ISO 1716—1973 (E), or with any International or British Standard replacing the same which the Secretary of State considers relevant from time to time and specifies in a Merchant Shipping Notice;
- (c) furniture in the corridors and stairway enclosures shall be kept to a minimum;
- (d) primary deck coverings shall be of approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures; and
- (e) waste paper receptacles shall be constructed of non-combustible materials and with solid sides and bottoms.

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

- (a) all ceilings, linings, draught stops and insulating materials shall be of non-combustible materials except in respect of:—
 - (i) mail rooms and baggage rooms;
 - (ii) materials used to insulate refrigerated compartments;
 - (iii) materials used to insulate valves associated with hot and cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded; and
 - (iv) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded;
- (b) paints, varnishes and other finishes used on exposed interior surfaces shall not be capable of producing excessive quantities of smoke and toxic products.

Miscellaneous items of fire protection

101.— (1) The following provisions shall apply to all parts of the ship:—

- (a) any pipe which penetrates an “A” Class division or “B” Class division shall be of suitable material having regard to the temperature such divisions are required to withstand;
- (b) pipes intended for oil or other flammable liquids shall be of suitable material having regard to the risk of fire;
- (c) overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to a danger of flooding; and
- (d) in spaces where penetration of oil products is possible the exposed surface of insulation shall be impervious to oil or oil vapours.

(2) The following provisions shall apply to the accommodation spaces, service spaces, and control stations:—

- (a) every air space enclosed behind a ceiling, panel or lining, shall be divided longitudinally and transversely by close fitting draught stops which shall be spaced not more than 14 metres apart and shall be closed at each deck;
- (b) every ceiling and lining shall be so constructed as to enable a fire patrol to detect any smoke originating in a concealed or inaccessible space without impairing the efficiency of the fire protection of the ship; the Secretary of State may exempt any ship from the requirement of this regulation if he is satisfied that there is no risk of fire originating in such a space;
- (c) electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum; no such heater shall be constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element; and
- (d) cellulose-nitrate film shall not be used for cinematograph installations.

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

102.— (1) In every ship there shall be installed in all accommodation spaces, service spaces and control stations throughout each separate main vertical zone or, if a main vertical zone is divided horizontally in accordance with regulation 92(3) into parts, throughout each part vertical zone either:—

- (a) an automatic sprinkler, fire detection and fire alarm system complying with the requirements specified in Schedule 7 to these Regulations and so arranged as to protect all such spaces in the ship; or
- (b) a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 to these Regulations and so arranged as to detect the presence or the signs of a fire and its location in any such spaces.

(2) The Secretary of State may exempt any ship from the requirements of this regulation in respect of:—

- (a) any spaces which afford no substantial fire risk; or
- (b) any control station.

Protection of special category spaces and ro/ro cargo spaces

103. The following provisions shall apply to special category spaces and ro/ro cargo spaces whether above or below the bulkhead deck:—

- (a) if it is not practicable to divide such spaces into main vertical zones, equivalent protection shall be obtained by dividing such spaces into horizontal zones; such a horizontal zone for the purpose of this regulation may include special category spaces or ro/ro cargo spaces on more than one deck provided that the overall height of the zone does not exceed 12 metres; the bulkheads and decks forming the boundaries of such a horizontal zone shall be insulated respectively as required for Category (11A) spaces in tables 5 and 6 at the end of regulation 94 of these Regulations;
- (b) the requirements of regulations 96 and 98 of these Regulations for maintaining the integrity of vertical zones shall apply to bulkheads and decks forming the boundaries separating horizontal zones from each other and from the remainder of the ship;
- (c) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 to these Regulations shall be provided;
- (d) indicators shall be provided on the navigating bridge which shall indicate when any access fire door in the boundary of a special category space or ro/ro cargo space is closed.
- (e) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition; ventilation ducts, including dampers, shall be of steel and arrangements shall be provided to permit a rapid shut-down and effective closure of the ventilation system in case of fire.

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

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

- (a) a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 or a sample extraction smoke detection system complying with Schedule 12 to these Regulations shall be provided;
- (b) a fixed pressure water spraying system complying with the requirements specified in Schedule 9 or a fixed gas fire-extinguishing system complying with the requirements specified in Schedule 10 to these Regulations shall be provided; and
- (c) the outlet from any exhaust ventilation duct shall be sited in a safe position having regard to possible sources of ignition; ventilation ducts, including dampers, shall be of steel.

Special arrangement in machinery spaces

105. The following provisions shall apply to machinery spaces:—

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) doors in the boundaries of machinery spaces of Category A, other than watertight doors and the fire-screen door referred to in paragraph (d), shall be arranged so that the closure of the door will be assured in the event of fire in the space; the doors shall be provided with closing arrangements which either comply with the regulation 95(6) of these Regulations or are provided with power operated closing arrangements operable from the control position required by regulation 71(4) of these Regulations; and
- (d) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door; the fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

SHIPS OF CLASSES III TO VI(A) INCLUSIVE

Application

106. Regulations 107 and 108 of this Part of these Regulations apply to passenger ships of Classes III to VI(A) inclusive.

Structure

107. Notwithstanding the requirements of regulation 108, the hull superstructure, structural bulkheads, decks and deckhouses of every ship of Classes III and IV shall be constructed of steel. The Secretary of State may exempt any ship wholly or in part from the requirement of this regulation.

Divisions

108. In every ship fitted with internal combustion propulsion machinery or oil-fired boilers the spaces containing such machinery shall be bounded by steel

or equivalent material which shall be gastight. The accommodation spaces shall be separated from such machinery spaces by "A" Class divisions.

SHIPS OF CLASSES I TO VI(A) INCLUSIVE

Application

109. Regulation 110 of this Part of these Regulations applies to passenger ships of Classes I to VI(A) inclusive.

Means of escape

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

(2) Notwithstanding the generality of paragraph (1) of this regulation in every ship of Classes I, II and II(A) the following shall be complied with:—

- (a) there shall be provided below the bulkhead deck at least two means of escape from each watertight compartment or from each similarly restricted space or group of spaces; at least one of the means of escape provided from each such compartment or from each such space or group of spaces shall be independent of watertight doors; one of the means of escape may be dispensed with, in an exceptional case, having regard to the nature and location of spaces and to the number of persons who normally might be accommodated or employed there;
- (b) there shall be provided above the bulkhead deck at least two means of escape from each space bounded by main vertical zone bulkheads or from each similarly restricted space or group of spaces;
- (c) at least one of the means of escape required by sub-paragraphs (a) and (b) of this paragraph shall be by means of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest; however, where only one means of escape is permitted for the purpose of compliance with sub-paragraph (a), the sole means of escape shall provide satisfactory safe escape;
- (d) satisfactory protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be provided;
- (e) lifts shall not be considered as forming one of the required means of escape;
- (f) stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape;
- (g) if a radio office has no direct access to a weather deck, two means of escape shall be provided from the office; the Secretary of State may permit one of these escapes to be an opening type window or sidescuttle of sufficient size;

- (h) dead-end corridors shall not be permitted to exceed 7 metres in ships carrying not more than 36 passengers and 13 metres in ships carrying more than 36 passengers; a dead-end corridor is a corridor, or part of a corridor from which there is only one escape route;
 - (i) in special category spaces and ro/ro cargo spaces the number and disposition of the means of escape both below and above the bulkhead deck shall be adequate, and, in general, the safety of access to the lifeboat and liferaft embarkation decks shall be at least equivalent to that required by sub-paragraphs (a), (b), (c), (d) and (e) of this paragraph; and
 - (j) one of the escape routes from the machinery spaces where the crew is normally employed shall avoid access to any special category space or ro/ro cargo space.
- (3) In every ship of Classes III to VI(A) inclusive, not being an open or partially-decked ship of Class V, VI or VI(A), such means of escape shall lead to an open deck of sufficient area, having regard to the number of persons which the ship may carry.
- (4) Every ship of Classes V, VI and VI(A), being an open or partially-decked ship, shall be provided with readily accessible means of escape from all enclosed spaces in the ship. Such means of escape shall be sufficient in number and width, having regard to the number of persons who may be in the said spaces.
- (5) In every ship of Classes I, II and II(A) suitable signs shall be displayed in passageways and stairways indicating the direction of escape routes to passenger muster stations. Such signs shall be continuously illuminated and shall be adequate in number and distribution. They shall be capable of being illuminated by the ship's emergency lighting system.
- (6) In every ship the means of escape from any public room which may be used for the purpose of concerts, cinema shows and similar forms of entertainment shall be adequate, having regard to the number of persons who may be in the audience, and the seating shall be arranged in rows to ensure free access to the exits. When in any such public room subdued lighting is used, the exits shall be clearly marked with illuminated signs and any doors shall be constructed to open outwards.
- (7) In the machinery spaces in every ship of Classes I, II and II(A) there shall be provided from each machinery space two means of escape in compliance with the following provisions:—
- (a) where the space is below the bulkhead deck the two means of escape shall consist of either:—
 - (i) two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks; one of these ladders shall be provided with continuous fire shelter from the lower part of the space to a safe position outside the space; or

- (ii) one steel ladder leading to a door in the upper part of the space from which access is provided to such embarkation deck and additionally in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides a safe escape route to the lifeboat and liferaft embarkation deck;
- (b) where the space is above the bulkhead deck, the two means of escape shall be as widely separated as possible the the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks; where such escapes require the use of ladders these shall be of steel; and
- (c) in a ship of less than 1,000 tons the Secretary of State may permit one of the means of escape required by this paragraph to be dispensed with having regard to the width and disposition of the upper part of the machinery space; in a ship of 1,000 tons or over the Secretary of State may permit one of the means of escape required by this paragraph to be dispensed with provided that either a door or a steel ladder provides a safe escape route to the embarkation deck having regard to the nature and location of the space and whether persons are normally employed in that space.

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

PART VII—STRUCTURAL FIRE PROTECTION:

SHIPS OTHER THAN PASSENGER SHIPS OR TANKERS TO WHICH PART VIII APPLIES

SHIPS OF CLASSES VII, VII(A), VIII, VIII(A), IX AND IX(A) AND CERTAIN TANKERS OF CLASSES VII(T), VIII(A)(T) AND IX(A)(T) OF 500 TONS AND OVER

Application

111.— (1) Regulations 112 to 125 inclusive of these Regulations apply to cargo ships of 500 tons and over except tankers to which Part VIII of these Regulations applies and fishing vessels to which regulation 126 applies.

(2) Regulations 112 to 125 inclusive of these Regulations also apply to ships of Classes VII(T), VIII(T), VIII(A)(T) and IX(A)(T) of 500 tons and over other than those ships referred to in regulation 128.

Structure

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

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

- (a) the insulation of aluminium alloy components of “A” Class divisions or “B” Class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” Class division and 30 minutes duration in the case of a “B” Class division; and
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, shall be such that the temperature rise limitation specified in sub-paragraph (2)(a) of this regulation shall apply for 60 minutes duration.

Method of fire protection

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

- (a) Method IC—The construction of all internal divisional bulkheading shall be of non-combustible “B” Class divisions or “C” Class divisions without the installation of an automatic sprinkler, fire detection and fire alarm system in the accommodation and service spaces, except as required by regulation 123 of these regulations; or
- (b) Method IIC—An automatic sprinkler, fire detection and fire alarm system as required by regulation 123 of these Regulations shall be fitted for the detection and extinction of fire in all spaces in which fire might be expected to originate with no restriction on the type of internal divisional bulkheading; or
- (c) Method IIIC—A fixed fire detection and fire alarm system, as required by regulation 123 of these Regulations shall be fitted in all spaces in which a fire might be expected to originate with no restriction on the type of internal divisional bulkheading, except that in no case shall the area of any accommodation space or spaces bounded by continuous “A” Class divisions and/or “B” Class divisions exceed 50 square metres subject to the requirements of paragraph (4) of regulation 114.

Bulkheads within accommodation spaces, service spaces and control stations

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

(2) In ships where Method IC is adopted all bulkheads which are not required by this Part of these Regulations to be either “A” Class divisions or “B” Class divisions, shall be “C” class divisions.

(3) In ships where Method IIC is adopted there shall be no restriction on the construction of bulkheads which are not required by this Part of these Regulations to be “A” Class divisions or “B” class divisions except where “C” Class bulkheads are required in accordance with table 7 at the end of regulation 115.

(4) In ships where Method IIC is adopted there is no restriction on the construction of bulkheads which are not required to be "A" Class divisions or "B" Class divisions except where "C" Class bulkheads are required in accordance with table 7 at the end of regulation 115. In no case shall the area of any accommodation space or spaces bounded by continuous "A" Class divisions and/or "B" Class divisions exceed 50 square metres provided that the Secretary of State may permit this area to be exceeded in public spaces.

Fire integrity of bulkheads and decks

115.—(1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this Part of these Regulations, the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 7 and 8.

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

- (a) tables 7 and 8 shall apply respectively to the bulkheads and decks separating adjacent spaces;
- (b) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (11) below; where the contents and use of a space are such that there may be doubt as to its classification for the purpose of this regulation, it shall be treated as a space within the relevant category having the most stringent boundary requirements; the number in parentheses preceding each category refers to the applicable column or row in the tables:—
 - (1) *control stations*:
 - (2) *corridors* include:
corridors and lobbies:
 - (3) *accommodation spaces* are:
spaces as defined in regulation 1(2) of these Regulations excluding stairways, corridors and lobbies:
 - (4) *stairways* include:
interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto; a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door:
 - (5) *service spaces of low risk* are:
lockers and store-rooms having an area of less than 2 square metres, drying rooms and laundries:
 - (6) *machinery spaces of Category A*:
 - (7) *other machinery spaces*:
 - (8) *cargo spaces* are:
cargo spaces as defined in regulation 1(2) of these Regulations and including trunkways and hatchways to such spaces but excluding spaces in category (11):

- (9) *service spaces of high risk* are:
galley, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 square metres or more, workshops other than those forming part of the machinery spaces;
- (10) *open decks* are:
open deck spaces and enclosed promenades having no fire risk; air spaces (the space outside superstructures and deckhouses);
- (11) *ro/ro cargo spaces etc.* are:
ro/ro cargo spaces as defined in regulation 1(2) of these Regulations; other cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion;
- (c) continuous “B” Class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division;
- (d) external boundaries which are required in regulation 112 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles. Similarly in such boundaries doors may be of materials to the satisfaction of the Secretary of State;
- (e) the integrity of “A” Class divisions shall be maintained at the intersections and boundaries of such divisions; and
- (f) (i) where superscripts^a toⁱ inclusive occur in tables 7 and 8 the following shall apply:—
- ^a no special requirements are imposed upon bulkheads in Method IIC fire protection (that is bulkheads may be combustible);
 - ^b no special requirements are imposed upon bulkheads in Method IIIC fire protection (that is bulkheads may be combustible) except that “A” Class bulkheads and/or “B” Class bulkheads shall be provided between spaces or groups of spaces of 50 square metres and over in area;
 - ^c regulation 116 applies;
 - ^d where spaces are of the same numerical category and superscript^d appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose;
 - ^e bulkheads separating the wheelhouse, chartroom and radio office from each other may be “B-0” standard;
 - ^f spaces for the storage of gas cylinders containing the fire extinguishing medium for cargo spaces shall not be located adjacent to such cargo spaces;
 - ^g for cargo spaces in which dangerous goods are intended to be carried, regulation 143(3)(m) of Part IX of these Regulations applies;
 - ^h bulkheads and decks separating ro/ro cargo spaces shall be capable of being closed reasonably gastight and such divisions shall have “A” Class integrity in so far as is reasonable and practicable in the opinion of the Secretary of State; and

- ⁱ fire insulation need not be fitted if the machinery space in Category (7) has little or no fire risk in the opinion of the Secretary of State; and
- (ii) where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be an “A” Class division.

TABLE 8 — FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

Spaces 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 of low risk	(5)	A-15	A-0	A-0	A-0	*	A-60	A-0	A-0	A-0	*	A-0
Machinery spaces of category A	(6)	A-60	A-60	A-60	A-60	A-60	*	A-60 ⁱ	A-30	A-60	*	A-60
Other machinery spaces	(7)	A-15	A-0	A-0	A-0	A-0	A-0	*	A-0	A-0	*	A-0
Cargo spaces	(8)	A-60 ^f	A-0	A-0	A-0	A-0	A-0	A-0	*	A-0	*	A-0
Service spaces of high risk	(9)	A-60	A-0	A-0	A-0	A-0	A-60	A-0	A-0	A-0 ^d	*	A-30
Open decks	(10)	*	*	*	*	*	*	*	*	*	—	*
Ro/ro cargo spaces etc.	(11)	A-60 ^f	A-30	A-30	A-30	A-0	A-60	A-0	A-0	A-30	*	* ^h

Protection of stairways and lifts in accommodation and service spaces

116.— (1) Every stairway within accommodation spaces, service spaces and control stations shall be constructed of steel except where the Secretary of State may approve the use of other equivalent material. Every such stairway and lift shall lie respectively within an enclosure or trunk constructed of “A” Class divisions of “A-O” standard except that an isolated stairway serving only two decks shall only be required to be enclosed at one level by either “A” Class divisions of “A-O” standard or “B” Class divisions of “B-O” standard provided that the fire integrity of any bulkhead which separates a stairway from either a machinery space of Category A or a ro/ro cargo space shall be determined by reference to table 7 of regulation 115 of these Regulations.

(2) Every opening in a stairway enclosure and lift trunk shall be provided with a means of closure which shall be permanently attached thereto and which shall comply with the requirements of regulation 117 or 118 of these Regulations whichever is applicable

Openings in “A” Class divisions

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

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

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

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

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

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

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

(7) Watertight doors need not be insulated.

(8) Where ventilation ducts pass through “A” Class divisions the requirements of regulation 119 shall apply.

Openings in “B” Class divisions

118.— (1) Where a “B” Class division is pierced for the passage of electric cables, pipes, trunks, girders or beams, or for other purposes, the arrangements

shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

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

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

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

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

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

Ventilation systems

119.— (1) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by regulation 117 of these Regulations, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall be insulated as required by the tables at the end of regulation 115.

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

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

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

- (a) ducts not less than 0.075 square metre in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;

- (b) subject to the requirements of sub-paragraph (c) and of paragraphs (5) and (6), ducts of less than 0.075 square metre in sectional area other than vertical ducts referred to in sub-paragraph (a) shall be constructed of non-combustible materials; where such ducts penetrate "A" Class divisions or "B" Class divisions the fire integrity of the division shall be maintained;
- (c) ducts, not exceeding 0.02 square metre in section area nor 2 metres in length, need not be non-combustible provided that the following conditions are satisfied:—
- (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) the ducts are used only at the terminal ends of the ventilation system; and
 - (iii) the ducts are not located closer than 0.6 metre along their lengths to penetrations of "A" Class divisions or "B" Class divisions.
- (5) Ducts provided for the ventilation of machinery spaces of Category A, galleys, ro/ro cargo spaces or cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either:—
- (a)
 - (i) constructed of steel having a thickness of at least 3 millimetres and 5 millimetres for ducts the widths or diameters of which are up to and including 300 millimetres and 760 millimetres and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 and 760 millimetres having a thickness to be obtained by interpolation;
 - (ii) suitably supported and stiffened; and
 - (iii) fitted close to the boundaries penetrated with automatic fire dampers, which are also capable of being closed manually; and
 - (iv) insulated to "A-60" standard from the machinery space, galley, ro/ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion to a point at least 5 metres beyond each fire damper; or
 - (b)
 - (i) constructed of steel in accordance with (a)(i) and (ii) of this paragraph; and
 - (ii) insulated to "A-60" standard throughout the accommodation spaces, service spaces or control stations.
- (6) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A, galleys ro/ro cargo spaces or cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion unless either:—
- (a)
 - (i) the ducts where they pass through a machinery space of Category A, galley, ro/ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion are constructed of steel in accordance with sub-paragraphs (5)(a)(i) and (ii) of this regulation; and

- (ii) automatic fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated; and
 - (iii) provided that the integrity of the boundaries of the machinery space, galley, ro/ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion is maintained at the penetrations; or
- (b) (i) the ducts where they pass through a machinery space of Category A, galley, ro/ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion are constructed of steel in accordance with sub-paragraphs (5)(a)(i) and (ii) of this regulation; and
- (ii) are insulated to "A-60" standard within the machinery space, galley, ro/ro cargo space or cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

(7) Exhaust ducts from galley ranges, where they pass through accommodation spaces or spaces containing combustible materials, shall be constructed of "A" Class divisions. Every such exhaust duct shall be fitted with:—

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

In addition to complying with sub-paragraph (b) above, galley ventilation ducts shall also comply with paragraph (5) of this regulation.

(8) Where a ventilation duct of sectional area exceeding 0.02 square metre passes through an "A" Class bulkhead or deck, the opening in the bulkhead or deck shall be lined with a steel sleeve unless the duct, where it passes through the bulkhead or deck, is constructed of steel. At the penetration the sleeve or duct shall comply with the following specification:—

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

(9) Where a ventilation duct of sectional area exceeding 0.02 square metre passes through a "B" Class division, the opening shall be lined with a steel sleeve of 900 millimetres in length unless the duct, where it passes through the division, is constructed of steel. One half of this length shall as far as possible be on each side of the division.

Details of construction

120.— (1) Where Method IC is adopted ceilings, linings, draught stops and their associated grounds in accommodation and service spaces and control stations shall be non-combustible.

(2) Where Method IIC or Method IIIC is adopted ceilings, linings, draught stops and their associated grounds in corridors and stairway enclosures serving accommodation and service spaces and control stations shall be non-combustible.

Restriction of combustible materials

121.— (1) All exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces within accommodation and service spaces and control stations shall be such that a surface spread of flame of Class 1 is not exceeded.

(2) Primary deck coverings in accommodation and service spaces and control stations shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures.

(3) Paints, varnishes and other finishes used on exposed surfaces within accommodation and service spaces, control stations and machinery spaces shall not contain nitrocellulose or other highly flammable base products and shall not be capable of producing excessive quantities of smoke. Such surfaces, except where otherwise required by these Regulations, shall be such that a surface spread of flame of Class 2 will not be exceeded: provided that these requirements shall not apply to furniture, furnishings, machinery and similar items.

(4) (a) Insulating materials shall be of non-combustible materials except in respect of:—

- (i) cargo spaces;
- (ii) materials used to insulate refrigerated compartments;
- (iii) materials used to insulate valves associated with hot and cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded; and
- (iv) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded.

(b) Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer not exceeding 2.0 millimetres in thickness within any such space except corridors, stairway enclosures and control stations, where the veneer shall not exceed 1.5 millimetres in thickness.

Miscellaneous items of fire protection

122.— (1) Any pipe which penetrates an "A" Class division or "B" Class division shall be of suitable material having regard to the temperature such divisions are required to withstand.

(2) In accommodation spaces, service spaces or control stations pipes intended to convey oil or other flammable liquids shall be of a suitable material having regard to the risk of fire.

(3) Overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to danger of flooding.

(4) Electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element.

(5) Cellulose-nitrate film shall not be used in cinematograph installations.

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

(7) In spaces where penetration of oil products is possible, the exposed surface of insulation materials shall be impervious to oil or oil vapours.

(8) Every air space enclosed behind a ceiling, panel or lining within accommodation spaces, service spaces and control stations shall be divided by close fitting draught stops which shall be spaced not more than 14 metres apart and which shall be closed at each desk.

Fixed fire detection and fire alarm system, and automatic sprinkler, fire detection and fire alarm system

123.— (1) In ships in which Method IC is adopted, a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 to these Regulations shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

(2) In ships in which Method IIC is adopted, an automatic sprinkler, fire detection and fire alarm system complying with the requirements specified in Schedule 7 of these Regulations 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 complying with the requirements specified in Schedule 11 to these Regulations shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces.

(3) In ships in which Method IIIC is adopted, a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 to these Regulations shall be so installed and arranged as to detect the presence of fire in all accommodation spaces and service spaces, except spaces which afford no substantial fire risk such as void spaces and sanitary spaces. Notwithstanding the foregoing exception smoke detection and manually operated call points shall be installed in all corridors, stairways and escape routes.

(4) Notwithstanding the provisions of paragraphs (1) to (3) inclusive of this regulation, smoke detectors in corridors, stairways and escape routes within accommodation spaces need not be installed until 1st September 1985.

Special arrangements in machinery spaces

124. The following provisions shall apply to machinery spaces:—

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries;
- (c) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door; the fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Means of escape

125.— (1) In every ship stairways and ladderways shall be arranged so as to provide ready means of escape to the lifeboat and liferaft embarkation deck from all accommodation spaces, service spaces and other spaces in which the crew are normally employed. In particular the following shall be complied with:—

- (a) at all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces;
- (b) below the lowest open deck such escapes shall be by means of stairways except that one of these stairways may be replaced by a trunked vertical ladder;
- (c) above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof;
- (d) one of the means of escape may be dispensed with in an exceptional case having regard to the nature and location of the space and to the number of persons who normally might be accommodated or employed there;
- (e) no dead-end corridors having a length of more than 7 metres shall be permitted; a dead-end corridor is a corridor or part of a corridor from which there is only one escape route;
- (f) the width and continuity of the means of escape shall be to the satisfaction of the Secretary of State; and
- (g) if a radio office has no direct access to the open deck, two means of escape from such office shall be provided; the Secretary of State may permit one of these escapes to be an opening type window or sidescuttle of sufficient size.

(2) In all cargo spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion where the crew is normally employed the number and locations of escape routes to the open deck shall be to the satisfaction of the Secretary of State but shall in no case be less than two and shall be as widely separated as possible.

(3) In every ship two means of escape shall be provided from each machinery space of Category A. In particular one of the following provisions shall be complied with:—

- (a) two sets of steel ladders as widely separated as possible leading to

doors in the upper part of the space similarly separated and from which access is provided to the lifeboat or liferaft embarkation deck or decks; in general, one of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space; the shelter shall be of steel, insulated where necessary, and be provided with a self-closing steel door at the lower end; or

- (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the lifeboat or liferaft embarkation deck or decks and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the lifeboat and liferaft embarkation deck.

(4) In a ship of less than 1,000 tons the Secretary of State may permit one of the means of escape required by paragraph (3) of this regulation to be dispensed with having regard to the size and disposition of the upper part of the space.

(5) From machinery spaces other than machinery spaces of Category A, escape routes shall be provided to the satisfaction of the Secretary of State having regard to the nature and location of the space and the number of persons normally employed in that space.

(6) Lifts shall not be considered as forming one of the required means of escape as required by this regulation.

SHIPS OF CLASS X

126. The structural fire protection arrangements for fishing vessels of Class X shall be in accordance with Section H, Part II of the Merchant Shipping Fishing Vessels (Safety Provisions) Rules 1975.

PART VIII—STRUCTURAL FIRE PROTECTION: TANKERS

TANKERS OF CLASSES VII(T), VIII(T), VIII(A)(T) AND IX(A)(T) OF 500 TONS AND OVER

Application

127. Regulations 128 to 142 inclusive of these Regulations apply to tankers of Classes VII(T), VIII(T), VIII(A)(T) and IX(A)(T) of 500 tons and over carrying crude oil and petroleum products having a closed flash-point not exceeding 60°C, and the Reid vapour pressure of which is below that of atmospheric pressure, or other liquids having a similar fire hazard; and to gas carriers.

Structure

128.—(1) The hull, superstructures, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material, except that the crowns and casings of machinery spaces of Category A and the exterior boundaries of superstructures and deckhouses which are required to be insulated to “A-60” standard in compliance with regulation 129 of these Regulations, shall be constructed only of steel.

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

- (a) the insulation of aluminium alloy components of “A” Class divisions or “B” Class divisions, and supports of such divisions, shall be such that the temperature of the structural core does not rise more than 200°C above the ambient temperature at any time during a standard fire test of 60 minutes duration in the case of an “A” Class division and 30 minutes duration in the case of a “B” Class division; and
- (b) the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, shall be such that the temperature rise limitation specified in sub-paragraph (2)(a) of this regulation shall apply for 60 minutes duration.

Exterior boundaries of superstructures and deckhouses

129.— (1) The exterior boundaries of superstructures, and deckhouses enclosing accommodation and service spaces, control stations and cargo control stations and any overhanging deck which supports such spaces shall be insulated to “A-60” standard for the whole of the portions of such boundaries which face the cargo area and on the sides of such boundaries for a distance of 3 metres measured horizontally and parallel to the middle line of the ship from the boundary which faces the cargo area at each deck level, except that such insulation need not be fitted to:—

- (a) the external bulkheads and overhanging decks of a wheelhouse; and
- (b) the external boundaries of spaces in which doors referred to in sub-paragraph (2)(a) below are fitted.

(2) In the exterior transverse boundary bulkheads facing the cargo area of superstructures and deckhouses enclosing accommodation and service spaces:—

- (a) doors shall not be fitted except to provide access to those spaces which do not have access to accommodation and service spaces and whose internal boundaries are insulated to “A-60” standard;
- (b) sidescuttles and windows other than wheelhouse windows shall be of a non-opening type;
- (c) windows shall not be fitted in the first tier of such superstructures and deckhouses on the upper deck and sidescuttles fitted in such a tier shall be fitted internally with permanently attached covers of steel;
- (d) sidescuttles and windows fitted in tiers above the first tier of such superstructures and deckhouses shall either be fitted internally with permanently attached covers of steel or be provided with portable covers of steel which shall be stowed within the space they are intended to serve; and
- (e) air inlets and other openings shall not be fitted.

(3) The provisions of paragraph (2) of this regulation shall also apply to the exterior boundary bulkheads at the sides of the superstructures and deckhouses enclosing accommodation and service spaces for a distance of at least 4 per cent of the length of the ship but not less than 3 metres nor more than 5 metres from the end of the superstructure or deckhouse facing the cargo area, such distance

being measured horizontally and parallel to the middle line of the ship from the exterior end transverse boundary bulkhead at each deck level as the said provisions apply to exterior boundary bulkheads facing the cargo area, except that sub-paragraph (a) of paragraph (2) of this regulation shall not apply to the exterior boundary bulkheads of the wheelhouse.

Boundary bulkheads and decks of machinery spaces of Category A and cargo pump rooms

130.— (1) Windows and sidescuttles shall not be fitted in internal or external boundary bulkheads or decks of machinery spaces of Category A and cargo pump rooms, or in skylights to such spaces, except that such windows and sidescuttles may be fitted in a bulkhead between a machinery space of Category A and a machinery control room located within the boundaries of such a space.

(2) Skylights to machinery spaces of Category A and cargo pump rooms shall be capable of being closed and opened from outside the spaces which they serve.

Bulkheads within accommodation spaces, service spaces and control stations

131.— (1) All bulkheads which are not required to be either “A” Class divisions or “B” Class divisions shall be “C” Class divisions.

(2) All bulkheads required to be “B” Class divisions shall extend from deck to deck and to the shell plating or other boundaries, except that where continuous “B” Class ceilings and/or linings are fitted on both sides of the bulkheads the bulkheads may terminate at such ceilings and/or linings.

(3) All materials used in the construction of “B” Class divisions and “C” Class divisions and doors in “B” Class bulkheads and “C” Class bulkheads shall be non-combustible.

Fire integrity of bulkheads and decks

132.— (1) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in this part of these Regulations the minimum fire integrity of bulkheads and decks shall be as prescribed in tables 9 and 10.

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

- (a) tables 9 and 10 shall apply respectively to the bulkheads and decks separating adjacent spaces;
- (b) for determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in categories (1) to (10) below; the title of each category is intended to be typical rather than restrictive; the number in parentheses preceding each category refers to the applicable column or row in the tables:
 - (1) *control stations*
 - (2) *corridors* include:
corridors and lobbies:
 - (3) *accommodation spaces* are:
spaces as defined in regulation 1(2) of these Regulations excluding

stairways, corridors and lobbies:

- (4) *stairways* include:
interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto; a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door;
 - (5) *service spaces of low risk* are:
lockers and store-rooms having areas of less than 2 square metres, drying rooms and laundries;
 - (6) *machinery spaces of Category A*:
 - (7) *other machinery spaces*:
 - (8) *cargo pump rooms* are:
spaces containing cargo pumps and entrances and trunks to such spaces;
 - (9) *service spaces of high risk are*:
galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having an area of 2 square metres or more, workshops other than those forming part of the machinery spaces;
 - (10) *open decks* are:
open deck spaces and enclosed promenades having no fire risk; air spaces (the space outside superstructures and deckhouses).
- (c) continuous “B” Class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division;
- (d) external boundaries which are required in regulation 129 to be of steel or other equivalent material may be pierced for the fitting of windows and sidescuttles. Similarly, in such boundaries doors may be of materials to the satisfaction of the Secretary of State;
- (e) permanent approved gastight lighting enclosures for illuminating cargo pump rooms may be permitted in bulkheads and decks separating cargo pump rooms and other spaces provided they are of adequate strength and the “A” Class integrity and gastightness of such bulkheads and decks are not impaired;
- (f) the integrity of “A” Class divisions shall be maintained at the intersections and boundaries of such divisions; and
- (g) (i) where superscripts ^a to ^e inclusive occur in tables 9 and 10 the following shall apply:
- ^a see regulation 133 applies;
 - ^b where spaces are of the same numerical category and superscript ^b appears, a bulkhead or deck of the rating shown in the tables is only required when the adjacent spaces are for a different purpose;
 - ^c bulkheads separating the wheelhouse, chartroom and radio room from each other may be “B-0” standard;
 - ^d bulkheads and decks between cargo pump rooms and machinery

spaces of Category A may be penetrated by cargo pump shaft glands and similar glanded penetrations, provided that gastight seals and efficient lubrication or other means of ensuring the permanence of the gastight seals are fitted in any of the bulkheads and decks; and

- ^e fire insulation need not be fitted if the machinery space in category (7) has little or no fire risk in the opinion of the Secretary of State;
- (ii) where an asterisk appears in the tables, the division is required to be of steel or other equivalent material but is not required to be an "A" Class division;

Protection of stairway and lifts in accommodation and service spaces

133.— (1) Every stairway within accommodation spaces, service spaces and control stations shall be constructed of steel except where the Secretary of State may approve the use of other equivalent material. Every such stairway and lift shall lie respectively within an enclosure or trunk constructed of “A” Class divisions of “A—O” standard except that an isolated stairway serving only two decks shall only be required to be enclosed at one level by either “A” Class divisions of “A—O” standard or “B” Class divisions of “B—O” standard provided that the fire integrity of any bulkhead which separates a stairway from either a machinery space of Category A or a cargo pump room shall be determined by reference to table 9 of regulation 132 of these Regulations.

(2) Every opening in a stairway enclosure and lift trunk shall be provided with a means of closure which shall be permanently attached thereto and which shall comply with the requirements of regulation 134 or 135 of these Regulations whichever is applicable.

Openings in “A” Class divisions

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

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

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

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

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

(a) have remote release fittings of a type which in the event of disruption of the control system will automatically close the doors; and

(b) will permit each door to be closed manually.

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

(7) Watertight doors need not be insulated.

(8) Where ventilation ducts pass through “A” Class divisions the requirements of regulation 136 shall apply.

Openings in “B” Class divisions

135.— (1) Where a “B” Class division is pierced for the passage of electric cables, pipes, trunks, girders or beams or for other purposes, the arrangements

shall be such that the effectiveness of the division in resisting fire is not thereby impaired.

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

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

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

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

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

Ventilation systems

136.— (1) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the decks required by regulation 134 of these Regulations, to reduce the likelihood of smoke and hot gases passing from one between-deck space to another through the system. In addition to insulation requirements contained in this regulation, vertical ducts shall, be insulated as required by the tables at the end of regulation 132.

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

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

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

- (a) ducts not less than 0.075 square metre in sectional area and all vertical ducts serving more than a single between-deck space shall be constructed of steel or other equivalent material;

- (b) subject to the requirements of sub-paragraph (c) and of paragraphs (5) and (6), ducts of less than 0.075 square metres in sectional area other than vertical ducts referred to in sub-paragraph (a) shall be constructed of non-combustible materials; where such ducts penetrate "A" or "B" Class divisions the fire integrity of the division shall be maintained;
- (c) ducts, not exceeding 0.02 square metre in section area nor 2 metres in length, need not be non-combustible provided that the following conditions are satisfied:—
- (i) the ducts are constructed of suitable material having regard to the risk of fire;
 - (ii) the ducts are used only at the terminal ends of the ventilation system; and
 - (iii) the ducts are not located closer than 0.6 metre along their lengths to penetrations of "A" Class divisions or "B" Class divisions.
- (5) Ducts provided for the ventilation of machinery spaces of Category A or galleys shall not pass through accommodation spaces, service spaces or control stations unless the ducts are either:—
- (a) (i) constructed of steel having a thickness of at least 3 millimetres and 5 millimetres for ducts the widths or diameters of which are up to and including 300 millimetres and 760 millimetres and over respectively and, in the case of such ducts, the widths or diameters of which are between 300 and 760 millimetres having a thickness to be obtained by interpolation;
 - (ii) suitably supported and stiffened;
 - (iii) fitted close to the boundaries penetrated with automatic fire dampers, which are also capable of being closed manually; and
 - (iv) insulated to "A-60" standard from the machinery space, or galley to a point at least 5 metres beyond each fire damper; or
 - (b) (i) constructed of steel in accordance with (a)(i) and (ii) of this paragraph; and
 - (ii) insulated to "A-60" standard throughout the accommodation spaces, service spaces or control stations.
- (6) Ducts providing ventilation to accommodation spaces, service spaces or control stations shall not pass through machinery spaces of Category A or galleys unless either:—
- (a) (i) the ducts where they pass through a machinery space of Category A, or galley are constructed of steel in accordance with sub-paragraphs (5)(a)(i) and (ii) of this regulation; and
 - (ii) automatic fire dampers, which are also capable of being closed manually, are fitted close to the boundaries penetrated; and
 - (iii) provided that the integrity of the machinery space or galley boundaries is maintained at the penetrations; or
 - (b) (i) the ducts where they pass through a machinery space of Category A, or galley are constructed of steel in accordance with sub-paragraphs (5)(a)(i) and (ii) of this regulation; and

(ii) are insulated to "A-60" standard within the machinery space or galley.

(7) Exhaust ducts from galley ranges, where they pass through accommodation spaces or spaces containing combustible materials, shall be constructed of "A" Class divisions. Every such exhaust duct shall be fitted with:—

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

In addition to complying with sub-paragraph (b) above, galley ventilation ducts shall also comply with paragraph (5) of this regulation.

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

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

(9) Where a ventilation duct of sectional area exceeding 0.02 square metre passes through a "B" Class division, the opening shall be lined with a steel sleeve of 900 millimetres in length unless the duct, where it passes through the division, is constructed of steel. This length shall be divided, if possible, into 450 millimetres on each side of the division.

Details of construction

137. All ceilings, linings, draught stops and their associated grounds in accommodation and service spaces and control stations shall be of non-combustible materials.

Restriction of combustible materials

138.— (1) All exposed surfaces in corridors and stairway enclosures and surfaces in concealed or inaccessible spaces within accommodation and service spaces and control stations shall be such that a surface spread of flame of Class 1 is not exceeded.

(2) Primary deck coverings in accommodation and service spaces and control stations shall be of an approved material which will not readily ignite or give rise to toxic or explosive hazards at elevated temperatures.

(3) Paints, varnishes and other finishes used on exposed surfaces within accommodation and service spaces, control stations and machinery spaces shall not contain nitrocellulose or other highly flammable base products and shall not be capable of producing excessive quantities of smoke. Such surfaces, except where otherwise required by these Regulations, shall be such that a surface spread of flame of Class 2 will not be exceeded: provided that these requirements shall not apply to furniture, furnishings, machinery and similar items.

(4) (a) Insulating materials shall be of non-combustible materials except in respect of:—

- (i) materials used to insulate refrigerated compartments;
- (ii) materials used to insulate valves associated with hot and cold service systems provided that their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded; and
- (iii) vapour barriers and adhesives used in conjunction with insulating materials, if their exposed surfaces are such that a surface spread of flame of Class 1 will not be exceeded.

(b) Where non-combustible bulkheads, linings and ceilings are fitted in accommodation and service spaces they may have a combustible veneer not exceeding 2.0 millimetres in thickness within any such space except corridors, stairway enclosures and control stations, where the veneer shall not exceed 1.5 millimetres in thickness.

Miscellaneous items of fire protection

139.— (1) Any pipe which penetrates an “A” Class division or “B” Class division shall be of suitable material having regard to the temperature such divisions are required to withstand.

(2) In accommodation spaces, service spaces or control stations pipes intended to convey oil or other flammable liquids shall be of a suitable material having regard to the risk of fire.

(3) Overboard scuppers, sanitary discharges or other outlets close to or below the waterline shall not be of a material likely to fail in the event of fire and thereby give rise to danger of flooding.

(4) Electric space heaters shall be fixed in position and shall be so constructed as to reduce the risk of fire to a minimum. No such heater shall be constructed with an element so exposed that clothing, curtains or other material can be scorched or set on fire by heat from the element.

(5) Cellulose-nitrate film shall not be used in cinematograph installations.

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

(7) In spaces where penetration of oil products is possible, the exposed surface of insulation materials shall be impervious to oil or oil vapours.

(8) Every air space enclosed behind a ceiling, panel or lining within accommodation spaces, service spaces and control stations shall be divided by close fitting draughts stops which shall be spaced not more than 14 metres apart and which shall be closed at each deck.

Fixed fire detection and fire alarm system

140. In every tanker to which this Part of these Regulations applies a fixed fire detection and fire alarm system complying with the requirements specified in Schedule 11 to these Regulations shall be so installed and arranged as to provide smoke detection and manually operated call points in all corridors, stairways and escape routes within accommodation spaces, except that such smoke detection need not be installed until 1st September 1985.

Special arrangements in machinery spaces

141. The following provisions shall apply to machinery spaces:—

- (a) the number of openings to machinery spaces shall be the minimum compatible with the proper working of the ship;
- (b) windows shall not be fitted in machinery space boundaries; and
- (c) any machinery space of Category A which is accessible from an adjacent shaft tunnel shall be provided with a light-weight steel fire-screen door in addition to any watertight door; the fire-screen door shall be operable from each side and shall be located at the shaft tunnel side of the bulkhead.

Means of escape

142. — (1) In every ship stairways and ladderways shall be arranged so as to provide ready means of escape to the lifeboat and liferaft embarkation deck from all accommodation spaces, service spaces and other spaces in which the crew are normally employed. In particular the following shall be complied with:—

- (a) at all levels of accommodation there shall be provided at least two widely separated means of escape from each restricted space or group of spaces;
- (b) below the lowest open deck such escapes shall be by means of stairways except that one of these stairways may be replaced by a trunked vertical ladder;
- (c) above the lowest open deck the means of escape shall be stairways or doors to an open deck or a combination thereof;
- (d) one of the means of escape may be dispensed with in an exceptional case having regard to the nature and location of the space and to the number of persons who normally might be accommodated or employed there;
- (e) no dead-end corridors having a length of more than 7 metres shall be permitted; a dead-end corridor is a corridor or part of a corridor from which there is only one escape route;
- (f) the width and continuity of the means of escape shall be to the satisfaction

of the Secretary of State;

- (g) if a radio office has no direct access to the open deck, two means of escape from such office shall be provided; the Secretary of State may permit one of these escapes to be an opening type window or sidescuttle of sufficient size.
- (2) In every ship two means of escape shall be provided from each machinery space of Category A. In particular one of the following provisions shall be complied with:—
- (a) two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the lifeboat or liferaft embarkation deck or decks; in general, one of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space; the shelter shall be of steel, insulated where necessary, and be provided with a self-closing steel door at the lower end; or
 - (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the lifeboat or liferaft embarkation deck or decks and additionally, in the lower part of the space and in a position well separated from the ladder referred to, a steel door capable of being operated from each side and which provides access to a safe escape route from the lower part of the space to the lifeboat and liferaft embarkation deck.
- (3) In a ship of less than 1000 tons the Secretary of State may permit one of the means of escape required by paragraph (2) of this regulation to be dispensed with having regard to the size and disposition of the upper part of the space.
- (4) From machinery spaces other than those of Category A, escape routes shall be provided to the satisfaction of the Secretary of State having regard to the nature and location of the space and the number of persons normally employed in that space.
- (5) Lifts shall not be considered as forming one of the required means of escape as required by this regulation.

PART IX—SPECIAL REQUIREMENTS FOR SHIPS CARRYING DANGEROUS GOODS

Application and special requirements

143.—(1) Subject to paragraph (2) of this regulation, passenger ships and other ships of 500 tons or over which are intended, or which contain cargo spaces which are intended, for the carriage of dangerous goods on international voyages shall comply with the protective requirements prescribed in paragraphs (4) to (12) of this regulation and the tables at the end of this regulation.

(2) This regulation shall not apply to ships or spaces intended for the carriage of dangerous goods in limited quantities as referred to in section 18 of the general introduction to the International Maritime Dangerous Goods Code.

(3) Nothing in this regulation shall be taken to require duplication of anything already provided in a ship in compliance with other requirements of these Regulations.

(4) The following requirements shall govern the application of the tables.

(5) For the purpose of determining the application of the requirements of sub-paragraphs (a)–(n) of paragraph 6 of this regulation, ships and cargo spaces are divided into categories (A)–(E) as set out below:

- (A) ships and cargo spaces not specifically designed for the carriage of freight containers but intended for the carriage of dangerous goods in package form including goods in freight containers and portable tanks;
- (B) purpose built container ships and cargo spaces intended for the carriage of dangerous goods in freight containers and portable tanks;
- (C) spaces intended for the carriage of dangerous goods which are:
 - (i) closed ro/ro cargo spaces, .
 - (ii) open ro/ro cargo spaces, or
 - (iii) ro/ro cargo spaces on the weather deck;
- (D) ships and cargo spaces intended for the carriage of solid dangerous goods in bulk;
- (E) ships and cargo spaces intended for the carriage of dangerous goods other than liquids and gases in bulk in shipborne barges.

Such categories are listed in the top horizontal row of table 11.

(6) The applicable requirements for the purposes of this regulation are set out in the following sub-paragraphs:—

- (a) arrangements shall be made to ensure immediate availability of a supply of water from the fire main at the required pressure either by a permanent pressurization of the firemain or by suitably placed remote starting arrangements for the fire pumps;
- (b) the quantity of water delivered shall be capable of supplying four nozzles of a size and at pressures as specified in regulation 61 and regulation 62 of these Regulations, capable of being trained on any part of the cargo space when empty. This amount of water may be applied by equivalent means to the satisfaction of the Secretary of State;
- (c) means of effectively cooling the designated under deck cargo space by copious quantities of water, either by a fixed pressure water spraying system complying with Schedule 9 to these Regulations or flooding the cargo space with water, shall be provided. Hoses may be used for this purpose in small cargo spaces and in small areas of larger cargo spaces at the discretion of the Secretary of State. The drainage and pumping arrangements shall be such as to prevent the build-up of free surfaces. If this is not possible, the adverse effect upon stability of the added weight and free surface of water shall be taken into account as necessary in calculating stability;
- (d) provision to flood a designated under deck cargo space with suitable specified media may be substituted for the requirements in sub-paragraph (c) of this paragraph of this regulation;
- (e) electrical equipment and wiring where permitted for such spaces shall be to the requirements of regulation 53(6) of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or to regulation 50 of

the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984, whichever is appropriate;

- (f) closed ro/ro cargo spaces and special category spaces shall be fitted with a fixed fire detection and fire alarm system complying with the requirements of Schedule 11 to these Regulations. All other types of cargo spaces shall be fitted with either such a fixed fire detection and fire alarm system or a sample extraction smoke detection system complying with the requirements of Schedule 12 to these Regulations;
- (g) adequate power ventilation shall be provided in enclosed cargo spaces. The arrangement shall be such as to provide for at least six air changes per hour in the cargo space based on an empty cargo space and for removal of vapours from the upper or lower parts of the cargo space, as appropriate;
- (h) the fans shall be such as to avoid the possibility of ignition of flammable gas air mixture. Suitable wire mesh guards shall be fitted over inlet and outlet ventilation openings;
- (i) where flammable or toxic liquids are to be carried in enclosed cargo spaces, the bilge pumping arrangements shall be to the requirements of regulation 36(5) of the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or of regulation 8(8) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984, whichever is appropriate;
- (j) four sets of full protective clothing resistant to chemical attack shall be provided in addition to the firemen's outfits required elsewhere in these Regulations. Protective clothing shall cover all skin so that no part of the body is unprotected;
- (k) at least two sets of self-contained breathing apparatus shall be provided in addition to the breathing apparatus otherwise required in these Regulations;
- (l) at least three portable fire extinguishers of the dry powder type or equivalent complying with regulation 68 of these Regulations shall be provided for each cargo space. These extinguishers shall be in addition to any portable fire extinguishers required elsewhere in these Regulations;
- (m) bulkheads forming boundaries between cargo spaces and machinery spaces of Category A shall be insulated to "A-60" standard unless the dangerous goods are stowed at least 3 metres horizontally away from such bulkheads. Boundaries other than bulkheads between such spaces shall be insulated to "A-60" standard. Dangerous goods of Class 1 shall be stowed 3 metres horizontally away from machinery space bulkheads in all cases and the common bulkheads shall be insulated to "A-60" standard;
- (n) each special category space, each open ro/ro cargo space having a deck over and each space deemed to be a closed ro/ro cargo space not capable of being sealed shall be fitted with a fixed pressure water spraying system complying with Schedule 9 to these Regulations for the protection of all parts of any deck and vehicle platform in such space, except that the Secretary of State may permit the use of any other fixed fire extinguishing system that has been shown by full scale test to be no less effective.

The sub-paragraphs of this paragraph are listed in the left hand vertical columns of Tables 11, 12 and 13.

(7) The classes of dangerous goods referred to in this regulation are those specified in the Merchant Shipping (Dangerous Goods) Regulations 1981. Such classes are listed in the top horizontal rows of tables 12 and 13.

(8) Ships and cargo spaces in categories A B C or E shall comply with a particular sub-paragraph of paragraph (6) of this regulation if

- (a) an "X" appears in table 11 where the vertical column for that category crosses the horizontal row for that sub-paragraph and
- (b) the dangerous goods (not being solid dangerous goods carried in bulk) which the ship or space as the case may be is intended to carry are of a class included in table 13 and an "X" appears in that table where the vertical column for that class crosses the horizontal row for that sub-paragraph.

(9) Ships and cargo spaces of category D shall comply with the requirements of a particular sub-paragraph of paragraph (6) of this regulation if the dangerous goods (being solid dangerous goods in bulk) are of a class included in table 12 and an "X" appears where the vertical column for that class of goods crosses the horizontal row for that sub-paragraph.

(10) Any requirement applicable in accordance with this regulation shall be applied subject to any exception or modification set out in the footnotes to the relevant table or tables which is applicable to that particular case.

(11) Where in a ship or cargo space of category D dangerous goods of class 4.3 are carried, the Secretary of State may, having regard to the hazards of the particular dangerous goods, impose such additional requirements as he may think necessary.

(12) Any enclosed cargo space of Category D which is not provided with power ventilation shall be provided with natural ventilation.

TABLE 11 — APPLICATION OF THE REQUIREMENTS TO DIFFERENT MODES OF CARRIAGE OF DANGEROUS GOODS IN SHIPS AND CARGO SPACES

Regulation 143(5)	(A) Not Specifically designed	(B) Container cargo spaces	(C)		(D) Intended for solid dangerous goods in bulk	(E) Shipborne barges
			Closed ro/ro cargo spaces	Open ro/ro cargo spaces		
Regulation 143(6)						
(a) Immediate availability of water supplies	x	x	x	x		x
(b) Quantity of water	x	x	x	x		—
(c) Water cooling	x	x	x	x		x
(d) Cargo space flooding	x	x	x	x		x
(e) Electrical equipment	x	x	x	x		x ^d
(f) Fire detection	x	x	x	x		x ^d
(g) Power ventilation	x	x ^a	x	x		x ^d
(h) Fans	x	x ^a	x	x		x ^d
(i) Bilge pumping	x	x	x	x		—
(j) Protective clothing	x	x	x	x		—
(k) Breathing apparatus	x	x	x	x		—
(l) Fire extinguishers	x	—	—	x		—
(m) Insulation of boundaries	x	x ^b	x	x		—
(n) Water spray	—	—	x ^c	x		—

Notes (Table 11)

a For dangerous goods of classes 4 and 5.1 not applicable to closed freight containers. For dangerous goods of classes 2, 3, 6.1 and 8 when carried in closed freight containers the ventilation rate may be reduced to not less than two air changes. For the purpose of this requirement a portable tank is a closed freight container.

b Applicable to decks only.

c Applies only to closed ro/ro cargo spaces, not capable of being sealed.

d In the special case where the barges are capable of containing flammable vapours or alternatively if they are capable of discharging flammable vapours to a safe space outside the barge carrier compartment by means of ventilation ducts connected to the barges, these requirements may be reduced or waived to the satisfaction of the Secretary of State.

TABLE 12—APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS FOR SHIPS AND CARGO SPACES CARRYING SOLID DANGEROUS GOODS IN BULK

Class of Dangerous Goods	4.1	4.2	4.3 ^f	5.1	6.1	8	9
Regulation 143(6)							
(a) Immediate availability of water supplies	x	x	—	x	x ^g	x ^g	x
(b) ^e Quantity of water	x	x	—	x	—	—	x
(e) Electrical equipment	x	x ^g	x	x ^g	—	—	x ^g
(g) ^h Power ventilation	x ^g	x ^g	x	x ^g	—	—	x ^g
(h) ^h Fans	x	x ^g	x	x ^g	—	—	x ^g
(j) & (k) Personnel protection	x	x	x	x	x	x	x
(m) Insulation of boundaries	x	x	x	x ^g	x ^g	x ^g	x

Notes (Table 12)

e This requirement is applicable only when the characteristics of the substance call for large quantities of water for fire fighting.

f For possible additional requirements see paragraph (11).

g Further requirements which may be applicable in a particular case are contained in the International Maritime Dangerous Goods Code (resolution A81(IV) as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended) as appropriate; as published by the International Maritime Organisation.

h In cases where power ventilation is required in the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended) the use of portable ventilation units or equipment to the satisfaction of the Secretary of State may suffice.

TABLE 13—APPLICATION OF THE REQUIREMENTS TO DIFFERENT CLASSES OF DANGEROUS GOODS EXCEPT SOLID DANGEROUS GOODS IN BULK

Class of Dangerous Goods	1	2	3	4	5.1	5.2	6.1	8
Regulation 143(6)								
(a) Immediate availability of water supplies	x	x	x	x ^o	x	x ^o	x	x
(b) ⁱ Quantity of water	x	x	x	x ^o	x	x ^o	—	—
(c) Water cooling	x ^k	—	—	—	—	—	—	—
(d) Cargo space flooding	x ^k	—	—	—	—	—	—	—
(e) Electrical equipment	x ^k	x ^l	x ^m	—	—	—	x ^{m/o}	x ^{m/o}
(f) Fire detection	x	x	x	x	x	—	x	x
(g) Power ventilation	—	x ^j	x ^m	x ^o	x ^o	—	x ^{m/o}	x ^{m/o}
(h) Fans	—	x ^l	x ^m	—	—	—	x ^{m/o}	x ^{m/o}
(i) Bilge pumping	—	—	x ^m	—	—	—	x ⁿ	x ^m
(j) & Personnel protection (k)	—	x	x	x	x	x ^o	x	x
(l) Fire extinguishers	—	—	x	x	x	x ^o	x ^o	x ^o
(m) Insulation of boundaries	x ^k	x	x	x	x ^o	—	x ^o	x ^o
(n) Water spray	x	x	x ^m	x ^o	x	—	x ^m	x ^m

Notes (Table 13)

i This requirement is applicable only when the characteristics of the substance call for large quantities of water for fire fighting.

j Applicable only to flammable or poisonous gases.

k Except dangerous goods of class 1 in division 1.4 compatibility group S.

l Applicable only to flammable gases.

m Applicable only to liquids having a flashpoint below 23°C (closed cup test).

n Applicable only to liquids.

o Further requirements which may be applicable are contained in the International Maritime Dangerous Goods Code (resolution A81(IV) as amended) or the Code of Safe Practice for Solid Bulk Cargoes (resolution A434(XI) as amended), as appropriate.

PART X—EQUIVALENTS, EXEMPTIONS, PENALTIES AND DETENTION

Alternative construction and equivalents

144. Where these Regulations require that the ship shall be constructed in a particular manner or that a particular fitting, material, appliance or apparatus or type thereof shall be fitted or carried in a ship, or that any particular provision shall be made, the Secretary of State may permit the ship to be constructed in any other manner or may approve any other fitting, material, appliance or apparatus, or type thereof, to be fitted or carried, or any other provision to be made in that ship, if he is satisfied by trial thereof or otherwise that such other construction, fitting, material, appliance or apparatus, or type thereof, or provision is at least as effective as that required by these Regulations.

Exemptions

145. The Secretary of State may grant exemptions from all or any of the provisions of these Regulations (as may be specified in the exemption) for classes

of cases or individual cases on such terms (if any) as he may so specify and may, subject to giving reasonable notice, alter or cancel any such exemption.

Penalties

146. If a ship to which these Regulations apply, proceeds or attempts to proceed to sea or on a voyage or excursion without complying with the requirements of these Regulations, the owner and master of the ship shall each be guilty of an offence and liable on summary conviction to a fine not exceeding £1,000 or on conviction on indictment, to imprisonment for a term not exceeding two years and a fine.

Powers to detain

147. In any case where a ship does not comply with the requirements of these Regulations, the ship shall be liable to be detained and section 692 of the Merchant Shipping Act 1894 (which relates to the detention of a ship) shall have effect in relation to the ship, subject to the modification that for the words "this Act" wherever they appear, there were substituted "the Merchant Shipping (Fire Protection) Regulations 1984".

Nicholas Ridley,
Secretary of State for Transport.

2nd August 1984.

SCHEDULE 1

Regulations 12 and 38

International Shore Connection

(1) The international shore connection which is required by these regulations to be carried in the ship shall be in accordance with the following specification:

Details of flange

Outside diameter: 178 millimetres

Inner diameter: 64 millimetres

Bolt circle diameter: 132 millimetres

Holes: 4 holes of 19 millimetres in diameter equidistantly placed, slotted to the flange periphery

Flange thickness: 14.5 millimetres minimum

Bolts: 4 each of 16 millimetres diameter; 50 millimetres in length with washers.

Flange surface: flat face

Material: any suited to 10 bar (1.0 N/mm²) service

Gasket: any suited to 10 bar (1.0 N/mm²) service

(2) The connection shall be constructed of material suitable for 10 bar (1.0 N/mm²). The flange shall have a flat face on one side and to the other there shall be permanently attached a coupling which will fit the ship's hydrants and hose. The connection shall be kept aboard the ship together with its gasket, bolts and washers.

SCHEDULE 2

Regulation 67(1)

Non-Portable Foam Fire Extinguishers

(1) Every foam fire extinguisher, other than a portable fire extinguisher provided in compliance with these Regulations, shall be constructed of suitable materials and shall be of an efficient design and of sufficient strength to withstand with an adequate factor of safety the maximum internal pressure to which it may be subjected and shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure. For the purpose of this Schedule the maximum working pressure shall be the equilibrium pressure that develops within the body at 70°C when the correctly charged extinguisher has been operated with all outlets closed.

(2) Where the extinguisher is provided with a gas cylinder as the means for expelling the extinguishing medium, such gas cylinder shall be constructed in accordance with British Standards Institution specification number BS 5045: Part 1: 1982.

(3) The extinguisher shall be provided with a nozzle and a reinforced discharge hose constructed to withstand four times the maximum working pressure specified in paragraph (1) of this Schedule.

(4) Where the extinguisher is provided with an inner container such container shall be adequately supported.

(5) Any necessary openings in the extinguisher body shall be fitted with caps or covers so designed that any pressure remaining in the container may be released gradually before the cap or cover can be removed completely.

(6) Every part of the extinguisher shall, where necessary, be protected against corrosion.

(7) The extinguisher shall be provided with a controllable device to enable the discharge to be interrupted and a means to prevent the loss of liquid when the extinguisher is standing.

(8) The extinguisher actuating mechanism shall be protected so that it is safeguarded against inadvertent operation.

(9) The design shall permit the ready availability of the extinguisher to be verified as required and ensure that it will be apparent whether or not the extinguisher has been operated.

(10) A fully charged extinguisher shall when operated under normal conditions be capable of projecting foam a distance of 14 metres for a period of not less than 90 seconds in the case of an extinguisher of 135 litres capacity and over, and a distance of 10 metres for a period of not less than 60 seconds in the case of an extinguisher of 45 litres or over but under 135 litres capacity.

(11) The outside of the extinguisher body shall be clearly marked in accordance with the relevant parts of Section Five of the British Standards Institution specification number BS 5423: 1980.

(12) The extinguisher shall have the correct filling level clearly indicated.

SCHEDULE 3

Regulation 67(1)

Non-Portable Carbon Dioxide Fire Extinguishers

(1) Every carbon dioxide fire extinguisher, other than a portable fire extinguisher, provided in compliance with these regulations shall be provided with cylinders constructed in accordance with British Standards Institution specification number BS 5396: 1976.

(2) Each cylinder shall be provided with an internal discharge tube and a valve to release the gas.

(3) The extinguisher shall be provided with a discharge hose which shall be reinforced so as to withstand a pressure of at least 122 bar when the necessary couplings are fitted. The bore of the discharge hose shall not be less than the size respectively set forth in the following table:—

Capacity of Extinguisher	Minimum bore of discharge hose
16 kilogrammes	10 millimetres
45 kilogrammes	12 millimetres

The discharge hose shall be provided with a horn which shall be of electrically non-conducting material and of a design which will reduce the velocity of the gas discharged. The metal part of the operating handle shall be suitably sheathed to protect the hands of the operator from extreme cold.

(4) At any temperature between 15°C and 18°C inclusive, the extinguisher shall discharge gas at such a rate that carbon dioxide equal in weight to 75 per cent. of the capacity of the container will be discharged in the periods respectively set forth in the following table:—

Capacity of extinguisher	Period
16 kilogrammes	30 to 45 seconds
45 kilogrammes	60 to 90 seconds

(5) The outside of the extinguisher shall be clearly marked in accordance with Section Seven of the British Standards Institution specification number BS 5423: 1980.

SCHEDULE 4

Regulation 67(1)

Non-Portable Dry Powder Fire Extinguishers

(1) Every dry powder fire extinguisher, other than a portable fire extinguisher, provided in compliance with these Regulations shall be constructed of suitable materials and shall be of an efficient design and of sufficient strength to withstand with an adequate factor of safety the maximum internal pressure to which it may be subjected and shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure. For the purpose of this Schedule the maximum working pressure shall be the equilibrium pressure that develops within the body at 70°C when the correctly charged extinguisher has been operated with all outlets closed.

(2) Where the extinguisher is provided with a gas cylinder as the means for expelling the extinguishing medium, such gas cylinder shall be constructed in accordance with British Standards Institution specification number BS 5045: Part 1: 1982.

(3) The extinguisher shall be provided with a nozzle and a reinforced discharge hose constructed to withstand four times the maximum working pressure specified in paragraph (1) of this Schedule.

(4) Any necessary openings in the extinguisher body shall be fitted with caps or covers so designed that any pressure remaining in the container may be released gradually before the cap or cover can be removed completely.

(5) Every part of the extinguisher shall, where necessary, be protected against corrosion.

(6) The extinguisher shall be effectively sealed to prevent the ingress of moisture, but such sealing arrangements shall not interfere with the discharge of the extinguisher.

(7) The extinguisher shall be provided with a controllable device to enable the discharge to be interrupted.

(8) The extinguisher actuating mechanism shall be protected so that it is safeguarded against inadvertent operation.

(9) The design shall permit the ready availability of the extinguisher to be verified as required and ensure that it will be apparent whether or not the extinguisher has been operated.

(10) A fully charged extinguisher shall, when operated under normal conditions, be capable of discharging not less than 85 per cent. of the mass of the dry powder charge. The discharge rate shall be not less than 1 kilogramme per second.

(11) The outside of the extinguisher body shall be clearly marked in accordance with the relevant parts of Section Five of the British Standards Institution Specification Number BS 5423: 1980.

SCHEDULE 5

Regulation 69(1)

Breathing Apparatus

Smoke helmet and smoke mask type breathing apparatus

(1) Every smoke helmet or smoke mask provided in compliance with these Regulations shall be provided with a hose for the supply of air from the outside atmosphere. An air

pump or bellows shall be provided which shall be suitable for pumping air through the hose. The hose shall be of the non-collapsing type and shall be sufficient in length to enable the air pump or bellows to be on the open deck in clean air well clear of any hatch or doorway while the wearer of the helmet or mask is in any part of the accommodation, service, cargo or machinery spaces. Efficient couplings shall be provided if two or more lengths of hose are to be joined in order to reach the aforesaid spaces. The air inlet to the pump or bellows shall be so protected as to ensure that the supply of air cannot be obstructed.

Self-contained breathing apparatus

- (2) (a) Every self-contained breathing apparatus provided in compliance with these Regulations shall be of the open circuit compressed air type and shall be of a type which has a Certificate of Assurance issued by the Health and Safety Executive in compliance with the requirements of the Joint Testing Memorandum of the Health and Safety Executive, the Department of Transport and the Home Department.
- (b) Provision may be made to enable an alternative means of air supply to be connected to the apparatus.
- (c) Every self-contained breathing apparatus shall be provided with not more than one face mask unless the apparatus has been certified by the Health and Safety Executive for use with a second face mask which may be used in extreme emergency.
- (d) The storage capacity of the compressed air cylinder or cylinders attached to the apparatus and carried by the wearer shall be at least 1,200 litres of fresh air. The storage cylinders shall be constructed of suitable material and shall be of efficient design and of sufficient strength to withstand with an adequate factor of safety, the internal air pressure to which they may be subjected and each cylinder shall be capable of withstanding a test by hydraulic pressure suitably in excess of the maximum working pressure.
- (e) Means shall be provided for the automatic regulation of the air supply to the wearer of the apparatus in accordance with his breathing requirements when he is breathing any volume of free air of up to 85 litres per minute at any time when the pressure in the supply cylinder or cylinders is above 10.5 bar (10.5 kilogrammes per square centimetre). Means shall be provided for overriding the automatic air supply to increase the volume of air available to the wearer if required.
- (f) A pressure gauge with an anti-bursting orifice shall be incorporated in the high pressure air supply system to enable the wearer to read directly and easily the pressure of air in the supply cylinder or cylinders.
- (g) The maximum weight of any such apparatus shall not exceed 16 kilogrammes, excluding any lifeline and, if they do not form an integral part of the apparatus, any safety belt or harness.
- (h) Every self-contained breathing apparatus shall be provided with fully charged spare cylinders having a spare storage capacity of at least 2,400 litres of free air except that:—
- (i) if the ship is carrying five sets or more of such apparatus the total spare storage capacity of free air shall not be required to exceed 9,600 litres; or
- (ii) if the ship is equipped with means for re-charging the air cylinders to full pressure with air, free from contamination, the spare storage capacity of the fully charged spare cylinders of each such apparatus shall be of at least 1,200 litres of free air, and the total spare storage capacity of free air provided in the ship shall not be required to exceed 4,800 litres.
- (i) A servicing and instruction manual shall be kept with each such apparatus.

General

- (3) (a) Every breathing apparatus shall be constructed of materials having adequate mechanical strength, durability and resistance to deterioration by heat or by contact with water and such materials shall be resistant to fire and shall not

allow the breathing circuit to be penetrated by smoke or chemical fumes likely to be encountered in service. The fabric used in the construction of any harness provided with such apparatus shall be resistant to shrinkage. Exposed metal parts of the apparatus, harness and fittings shall be of materials so far as practicable resistant to frictional sparking.

- (b) The following equipment shall be provided for use with each set of breathing apparatus:
- (i) a fire-proof life-and-signalling-line at least 3 metres longer than is required to reach from the open deck in clean air well clear of any hatch or doorway to any part of the accommodation, service, cargo, or machinery spaces. The line shall be made of copper or galvanised steel wire rope having a breaking strength of at least 500 kilogrammes and shall be overlaid up to at least 32 millimetres in circumference by hemp or other covering to provide a surface which can be firmly gripped when wet;
 - (ii) an adjustable safety belt or harness to which such line shall be capable of being securely attached and detached by the wearer by means of a snaphook;
 - (iii) means for protecting the eyes and face of the wearer against smoke;
 - (iv) plates of suitable non-flammable material bearing a clearly legible code of signals to be used between the wearer and his attendant one of which shall be attached to the safety belt or harness and another attached to the free end of the life-line.
- (c) Every breathing apparatus shall be clearly marked with the name of the maker or vendor and the year of manufacture. Operating instructions in clear and permanent lettering shall be affixed to such apparatus.

SCHEDULE 6

Regulations 4(4)(b), 7(2)(b) and (3)(b), 30(2)(b) and 33(2)(b) and 3(b)

Portable Foam Applicator Units

- (1) Every portable foam applicator unit provided in compliance with these Regulations shall be provided with:—
- (a) an induction type of air foam nozzle capable of being connected to the fire main by means of a fire hose;
 - (b) a portable tank containing at least 20 litres of foam concentrate from which the nozzle specified at sub-paragraph (a) of this paragraph can induce the contents;
 - (c) a spare tank identical to that specified at sub-paragraph (b) of this paragraph.
- (2) The nozzle whilst being supplied at the minimum hydrant pressure on the ship permitted by these Regulations shall be capable of producing effective foam suitable for extinguishing an oil fire at the rate of at least 1.5 cubic metres per minute.
- (3) The ratio of the volume of foam produced to the volume of foam solution shall not exceed 12 to 1.

SCHEDULE 7

Regulations 77(2)(b), 78(3)(d)(e) and (g), 80(7), 81(4), 84(2)(a), 86(1)(a), 93(2)(b), 94(3)(d) and (e), 96(7), 97(5), 100(2)(a), 102(1)(a) and 123(2)

Automatic Sprinkler, Fire Detection and Fire Alarm Systems

- (1) (a) Every automatic sprinkler, fire detection and fire alarm system shall be

capable of immediate operation at all times and no action by the crew shall be necessary to set it in operation. It shall be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of the Secretary of State this is a necessary precaution. Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing. The system shall be kept charged at the necessary pressure and shall have provision for a continuous supply of water as required in this Schedule.

- (b)
 - (i) Each section of sprinklers shall include means for giving a visual and audible alarm signal automatically at one or more indicating units whenever any sprinkler comes into operation. Such alarm systems shall be such as to indicate if any fault occurs in the system.
 - (ii) In passenger ships such units shall give an indication of any fire and its location in any space served by the system and shall be centralised on the navigating bridge or in the main fire control station, which shall be so manned or equipped as to ensure that any alarm from the system is immediately received by a responsible member of the crew.
 - (iii) In cargo ships such units shall indicate in which section served by the system fire has occurred and shall be centralised on the navigating bridge and in addition, visible and audible alarms from the unit shall be placed in a position other than on the navigating bridge, so as to ensure that the indication of fire is immediately received by the crew.
- (2)
 - (a) Sprinklers shall be grouped into separate sections, each of which shall contain not more than 200 sprinklers. In passenger ships any section of sprinklers shall not serve more than two decks and shall not be situated in more than one main vertical zone. However, the Secretary of State may permit such a section of sprinklers to serve more than two decks or be situated in more than one main vertical zone, if he is satisfied that the protection of the ship against fire will not thereby be reduced.
 - (b) Each section of sprinklers shall be capable of being isolated by one stop valve only. The stop valve in each section shall be readily accessible and its location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the stop valves by any unauthorised person.
 - (c) A gauge indicating the pressure in the system shall be provided at each section stop valve and at a central station.
 - (d) The sprinklers shall be resistant to corrosion by marine atmosphere. In accommodation and service spaces the sprinklers shall come into operation within the temperature range from 68°C to 79°C, except that in locations such as drying rooms, where high ambient temperatures might be expected the operating temperature may be increased by not more than 30°C above the maximum deckhead temperature.
 - (e) A list or plan shall be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.
 - (f) Sprinklers shall be placed in an overhead position and spaced in a suitable pattern to maintain an average application rate of not less than 5 litres per square metre per minute over the nominal area covered by the sprinklers. Alternative distribution arrangements or sprinklers providing other amounts of water may be permitted providing the arrangements are no less effective.
 - (g) Sprinklers shall be spaced not more than 4 metres apart and not more than 2 metres from a bulkhead. They shall be placed as clear as possible of beams or other objects likely to obstruct the projections of water and in such positions that combustible material in the space concerned will be well sprayed.
 - (h) At least six spare sprinklers shall be provided for each section.
- (3)
 - (a) A pressure tank having a volume equal to at least twice that of the charge of water specified in this sub-paragraph shall be provided. The tank shall contain a standing charge of fresh water, equivalent to the amount of water which would be discharged in one minute by the pump referred to in paragraph

- (4)(b) of this Schedule and the arrangements shall provide for maintaining an air pressure in the tank such as to ensure that where the standing charge of fresh water in the tank has been used the pressure will be not less than the working pressure of the sprinkler, plus the pressure exerted by a head of water measured from the bottom of the tank to the highest sprinkler in the system. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank shall be provided.
- (b) The pressure tank shall be fitted with an efficient relief valve and with a water gauge glass and a pressure gauge. Stop valves or cocks shall be provided at each of the gauge connection. Means shall be provided to prevent the inadvertent admission of sea water into the tank.
- (4) (a) An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.
- (b) The pump and the piping system shall be capable of maintaining the necessary pressure at the level of the highest sprinkler to ensure a continuous output of water sufficient for the simultaneous coverage of a minimum area of 280 square metres at the application rate specified in paragraph (2)(f) of this Schedule.
- (c) The pump shall have fitted on the delivery side a test valve with a short open ended discharge pipe. The effective area through the valve and pipe shall be adequate to permit the release of the required pump output while maintaining the pressure in the system specified in paragraph (3)(a) of this Schedule.
- (d) The pump shall have a suction direct from the sea which shall be independent of any other suction and which shall be in the space containing the pump. The sea inlet to the pump shall be so arranged that when the ship is afloat it will not be necessary to shut off the supply of sea water to the pump for any purpose other than the inspection or repair of the pump.
- (5) The sprinkler pump and tank shall be situated in a position reasonably remote from any machinery space of Category A and shall not be situated in any space required to be protected by the sprinkler system.
- (6) (a) Not less than two sources of power supply for the sprinkler pump, air compressor and automatic alarm and detection system shall be provided in passenger ships. Where the sources of power are electrical one shall be an emergency source. One supply for the pump shall be taken from the main switchboard and one from the emergency switchboard by separate feeders reserved solely for that purpose. The feeders shall be arranged so as to avoid galleys, machinery spaces and other enclosed spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards and shall be run to an automatic changeover switch situated near the sprinkler pump. This switch shall permit the supply of power from the main switchboard so long as a supply is available therefrom, and be so designed that upon failure of that supply it will automatically change over to the supply from the emergency switchboard. The switches on the main and emergency switchboards shall be clearly labelled and normally kept closed. No other switch shall be permitted in the feeders concerned. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion type engine it shall, in addition to complying with the provisions of paragraph (5) of this Schedule, be so situated that a fire in any protected space will not affect the air supply to the machinery.
- (b) In cargo ships there shall not be less than two sources of power supply for the sea water pump and automatic alarm and detection system. If the pump is electrically driven it shall be connected to the main source of electrical power, which shall be capable of being supplied by at least two generators. The feeders shall be so arranged as to avoid galleys, machinery spaces and other enclosed

spaces of high fire risk except in so far as it is necessary to reach the appropriate switchboards. One of the sources of power supply for the alarm and detection system shall be an emergency source. Where one of the sources of power for the pump is an internal combustion engine it shall, in addition to complying with the provisions of paragraph (5) of this Schedule be so situated that a fire in any protected space will not affect the air supply to the machinery.

(7) Every sprinkler system shall have a connection from the ship's fire main provided with a screw down valve and non return valve at the connection which will prevent a back flow from the sprinkler system to the fire main. In addition, there may be fitted hose couplings with shut off valves and non-return valves situated close to the couplings for the purpose of coupling to a shore supply, but no other external connection shall be fitted. The sprinkler system shall be a self contained unit. Shut off valves for the shore supply and the ship's fire mains connections shall be clearly and permanently marked to show their purpose and shall be capable of being locked in the closed position.

- (8) (a) A test valve shall be provided for testing the automatic alarm for each section of sprinklers by a discharge of water equivalent to the operation of one sprinkler. The test valve for each section shall be situated near the stop valve for that section.
- (b) Means shall be provided for testing the automatic operation of the pump on reduction of pressure in the system.
- (c) Switches shall be provided at one of the indicating positions referred to in paragraph (1)(b)(i) of this Schedule which will enable the alarm and the indicators for each section of sprinklers to be tested.

SCHEDULE 8

Regulations 7(1)(a), 8(c), 33(1)(a) and 34(c)

Fixed Pressure Water Spraying Systems for Machinery Spaces and Cargo Pump Rooms

(1) Every fixed pressure water spraying system fitted in compliance with these Regulations shall be provided with a pump, piping system, control valves and spraying nozzles. The pump provided for machinery space protection shall not be used for any other purpose except that the Secretary of State may permit the pump to be used for supplying cargo pump room or cargo space water spraying systems where such systems are permitted. For cargo pump room protection the water supply may be from the ship's main fire pumps provided such pumps comply with the requirements of this Schedule.

(2) The spraying nozzles shall be of such a type, sufficient in number and so arranged as to ensure an effective average distribution of water in accordance with the following table:—

Protected area	Application rate	
	litres per sq. metre/min	gallons per sq. ft/min
Boiler fronts or roof firing areas, oil fuel units, centrifugal separators (not oily water separators), oil fuel purifiers and clarifiers.	20	0.4
Hot oil fuel pipes near exhaust pipes or similar heated surfaces on main or auxiliary diesel engines	10	0.2
Tank top areas and oil tanks not forming part of the ship's structure,	5	0.1
Cargo pump rooms	10	0.2

(3) Spraying nozzles shall be fitted above bilges, tank tops and other areas over which oil fuel is liable to spread and above other main fire hazards in the spaces to be protected.

(4) The water spraying system may be divided into sections and shall be controlled from distribution manifolds the valves of which shall be capable of being operated from easily accessible positions outside the spaces to be protected and which will not be readily cut off by an outbreak of fire within the protected space.

(5) The water spraying system shall be kept charged at the necessary pressure and the pump supplying the water for the system shall be automatically put into action by a pressure drop in the system.

(6) The pump may be driven by independent internal combustion type machinery but if it is dependent upon power being supplied from the emergency generator fitted in compliance with the Merchant Shipping (Passenger Ship Construction and Survey) Regulations 1984 or the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984, the generator shall be arranged to start automatically in case of main power failure so that power for the pump is immediately available. When the pump is driven by independent internal combustion type machinery it shall be so situated that a fire in the protected space will not affect the air supply to the machinery and the pump compartment.

(7) The pump shall be capable of supplying water at the necessary pressure simultaneously to all sections of the water spraying system in any one compartment to be protected. The pump and its controls shall be installed outside the space or spaces to be protected. It shall not be possible for a fire in the space or spaces protected by the water spraying system to put the system out of action.

(8) Means shall be provided which will prevent nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pumps.

(9) No part of the water spraying system shall be situated forward of the collision bulkhead in any passenger ship.

(10) Operating instructions in clear and permanent lettering shall be affixed to every water spraying system or in a position adjacent thereto.

SCHEDULE 9

Regulations 5(2), (3) and (4), 31(3), 87(c), 88(b), 103(c), 104(b) and 143(6)(c)

Fixed Pressure Water Spraying Systems for Cargo Spaces

(1) Every fixed pressure water spraying system fitted in compliance with these Regulations shall be provided with a pump, piping system, control valves and spraying nozzles.

(2) The nozzles shall be of an approved full bore type and shall be arranged so as to secure an effective distribution of water in the spaces which are to be protected.

(3) The system shall be such as will provide water application at a rate of at least 3.5 litres per square metre per minute for spaces with a deck height not greater than 2.5 metres and at least 5 litres per square metre per minute for spaces with a deck height greater than 2.5 metres.

(4) Precautions shall be taken to prevent the nozzles from becoming clogged by impurities in the water.

(5) The system shall cover the full breadth of the protected space except that in ships where the protected space is subdivided with longitudinal Class "A" divisions the breadth of the sections may be reduced accordingly. In ships of Classes I, II, VII or VIII and in ships of Classes II(A) or VIII(A) of 76 metres or over in length or where the length of the enclosed part of the protected space is 50 metres or over, the system may be divided into sections provided they are at least 20 metres in length. In ships of other classes the length of a section may be less than 20 metres but shall be not less than 10 metres provided the capacity of the pumps are capable of supplying the two largest adjacent sections simultaneously at the application rate referred to in paragraph (3) of this Schedule.

(6) The distribution valves for the system shall be situated in an easily accessible position adjacent to, but outside, the space to be protected which will not readily be cut off by a fire within the space. Direct access to the distribution valves from the protected spaces and from outside the spaces shall be provided. Adequate ventilation shall be fitted in the space containing the distribution valves.

(7) The water supply to the system shall be provided by a pump or pumps, other than the ship's required fire pumps which shall additionally be connected to the system by a lockable non-return valve which will prevent a back flow from the system into the fire main.

(8) The principal pump or pumps shall be capable of supplying simultaneously, at all times, at the required pressure all nozzles in the protected spaces, or two adjacent sections if this is less, a quantity of water in accordance with paragraphs (2) and (3) of this Schedule.

(9) The principal pump or pumps shall be capable of being brought into operation by remote control, which may be manually actuated, from the position at which the distribution valves are situated.

(10) In ships of Classes I and II, and in ships of Class II(A) of 76 metres or over in length or where the length of the enclosed part of the protected space is 50 metres or over the principal pump or pumps shall be situated in a position reasonably remote from the protected space and from any machinery space of Category A. In ships of other Classes the principal pump or pumps shall be situated outside the protected space but may be situated within any machinery space.

(11) In ships of Classes I and II, and in ships of Class II(A) of 76 metres or over in length or where the length of the enclosed part of the protected space is 50 metres or over, if the principal pump or pumps are electrically driven there shall be two sources of power, one of which shall be the emergency generator. In ships of other Classes there shall be two sources of power which may be two of the auxiliary generators provided they are independently driven. If the principal pump or pumps are driven by independent internal combustion type machinery they shall be so situated that a fire in the protected space will not affect the air supply to the machinery and the pump compartment.

(12) When a fixed pressure water spraying system is provided for the machinery spaces in accordance with Schedule 8 to these Regulations the pump required for that system may also be used for the purpose of complying with this Schedule.

(13) The sea suction of the pump shall be so arranged that, when the ship is afloat, it will not be necessary to shut off the supply of sea water to the pump for any purpose other than the inspection or repair of the pump.

(14) The pump suction and discharge valves and any other valves requiring to be operated to bring the pump into operation shall be locked open or be operable from any

control position of the system. A pressure gauge shall be provided at such control positions to show when water is available.

(15) A waste valve with a short open ended pipe shall be fitted between the pump discharge and section control valves for testing purposes.

(16) The pipes of the system shall be solid drawn or welded steel or equivalent and they shall be hydraulically tested by the manufacturers to twice the working pressure but not less than 20 bar (2N/mm²) and be galvanised internally to prevent corrosion.

(17) Fittings such as self aligning swivel joints and flexible pipes situated within the protected space shall not be readily rendered ineffective by heat and where such fittings are used at least one spare of each type fitted shall be carried.

SCHEDULE 10

Regulations 5(1) and (3), 7(1)(b), 8(c), 31(1), (2)(a) and (3), 33(1)(b), 34(c), 43(5)(a), 87(c), 88(b) and 104(b)

Fixed Gas Fire Extinguishing Systems

General

- (1) (a) Fire extinguishing systems provided for use in any ship to which these Regulations apply shall not contain an extinguishing medium which either itself or under expected conditions of use gives off toxic gases in such quantities as to endanger personnel.
- (b) (i) In every such system provided for the injection of fire extinguishing medium into any compartment for fire extinguishing purposes, the pipes for conveying the medium shall be provided with control valves or cocks which shall be so placed that they will be easily accessible and not readily cut off from use by an outbreak of fire within the protected compartment. Such control valves or cocks shall be permanently marked to indicate clearly the compartments to which the pipes are led.
- (ii) Where cargo spaces fitted with a gas extinguishing system for fire protection are used as passenger spaces the extinguishing connection shall be blanked during service as a passenger space.
- (iii) Suitable provisions shall be made to prevent inadvertent admission of the medium to any compartment.
- (c) The piping for the distribution of fire extinguishing medium shall be arranged and discharge nozzles so positioned that a uniform distribution of medium is obtained.
- (d) Means shall be provided to close all openings which may admit air to or allow gas to escape from a protected space.
- (e) Where the volume of free air contained in air receivers in any space is such that, if released in such space in the event of fire, such release of air within that space would seriously affect the efficiency of the fixed fire extinguishing system, an additional quantity of fire extinguishing medium shall be provided.
- (f) Means shall be provided for automatically giving audible warning of the release of fire extinguishing medium into any space in which personnel normally work or to which they have access. The alarm shall operate for a suitable period before the medium is released.
- (g) The means of control of any fixed gas fire extinguishing system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in a protected space. At each location there shall be clear instructions relating to the operation of the system having regard to the safety of personnel.
- (h) Automatic release of fire extinguishing medium shall not be permitted except

as provided by paragraph (3)(c)(v) and in respect of local automatically operated units referred to in paragraphs (3)(d) and (3)(e) of this Schedule.

- (i) Where the quantity of extinguishing medium is required to protect more than one space, the quantity of medium available need not be more than the largest quantity required for any one space so protected.
- (j) Except as otherwise permitted by paragraphs (3)(c), (3)(d) and (3)(e) of this Schedule, pressure containers required for the storage of fire extinguishing medium shall be located outside protected spaces in accordance with paragraph (1)(l) of this Schedule.
- (k) The storage containers and associated pressure components shall be constructed of suitable material and shall be of efficient design and sufficient strength having regard to their locations and maximum ambient temperatures expected in service.
- (l) When the fire extinguishing medium is stored outside a protected space, it shall be stored in a room which shall be situated in a safe and readily accessible position and shall be effectively ventilated to the satisfaction of the Secretary of State. Any entrance to such a storage room shall be from the open deck and in any case shall be independent of the protected space. Access doors shall open outwards, and bulkheads and decks including doors and other means of closing any opening therein, which form the boundaries between such rooms and adjoining enclosed spaces shall be gastight. For the purpose of the application of the integrity tables in regulations 78, 93, 111 and 129 of these Regulations, such storage rooms shall be treated as control stations.
- (m) Spare parts for the system shall be stored on board and be to the satisfaction of the Secretary of State.

Carbon dioxide systems

- (2) (a) When carbon dioxide is used as the extinguishing medium in cargo spaces, the quantity of gas available shall be sufficient to give a minimum volume of free gas equal to 30 per cent of the gross volume of the largest cargo compartment in the ship which is capable of being sealed.
- (b) When carbon dioxide is used as the extinguishing medium in cargo spaces containing motor vehicles with fuel in their tanks for their own propulsion or in closed ro/ro spaces or closed ro/ro spaces used for bulk stowage of cargo, the quantity of gas available shall be sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being effectively sealed.
- (c) When carbon dioxide is used as an extinguishing medium for machinery spaces or pump rooms, the quantity of gas available shall be sufficient to give a minimum of free gas equal to the larger of the following quantities, either
 - (i) 40 per cent of the gross volume of the largest space, such volume being measured up to the level at which the horizontal area of the casing is 40 per cent or less of the gross area of such space measured midway between the tank top and the lowest part of the casing; or
 - (ii) 35 per cent. of the gross volume of the largest space including the casing: provided that the aforesaid percentages may be reduced to 35 per cent and 30 per cent respectively for ships or under 2,000 tons, not being passenger ships, provided also that if two or more machinery spaces are not entirely separate they shall be considered as forming one space.
- (d) The volume of carbon dioxide shall be calculated at 0.56 cubic metre per kilogramme.
- (e) (i) When carbon dioxide is used as the extinguishing medium for machinery spaces or pump rooms the arrangements shall be such that 85 per cent of the gas required to provide the concentration referred to in paragraph (2)(c) of this Schedule when applied to the space concerned can be discharged into that space within two minutes.
- (ii) When carbon dioxide is used as the extinguishing medium in cargo

spaces containing motor vehicles with fuel in their tanks for their own propulsion or in closed ro/ro spaces the arrangements shall be such as to ensure that at least two thirds of the gas required for the space can be introduced within 10 minutes.

- (f) Safe means shall be provided for the crew to check the quantity of medium within the containers.

Halogenated hydrocarbon systems

- (3) (a) The use of halogenated hydrocarbons as fire extinguishing media is only permitted in machinery spaces, pumprooms and in cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo.
- (b) When halogenated hydrocarbons are used as the fire extinguishing media in total flooding systems:
- (i) The system shall be arranged for manual initiation of power release only and such means shall be provided outside the protected space.
 - (ii) Where the charge of halogenated hydrocarbon is required to supply more than one space, the arrangements for its storage and release shall comply with paragraph (3)(b)(ix) or (3)(b)(x) of this Schedule for each such space.
 - (iii) Means shall be provided for stopping automatically all ventilation fans serving the protected space before the medium is released.
 - (iv) Means shall be provided to close manually all dampers in the ventilation system serving a protected space.
 - (v) The arrangements shall be such that the liquid phase of the minimum quantity of medium required by paragraphs (3)(b)(ix) or (3)(b)(x) of this Schedule when applied to the space concerned can be discharged into that space within 20 seconds or less.
 - (vi) The system shall be designed to operate within the temperature range likely to be experienced in service.
 - (vii) Discharge nozzles shall be so positioned that a uniform distribution of fire extinguishing medium is obtained and the discharge does not endanger personnel engaged on maintenance of machinery or equipment or using the normal access ladders and escapes serving the compartment.
 - (viii) Safe means shall be provided for the crew to check the quantity of medium in the containers and the pressure therein.
 - (ix) The quantity of extinguishing medium for cargo spaces intended solely for the carriage of vehicles which are not carrying any cargo shall be calculated in accordance with the following table. This quantity shall be based on the gross volume of the protected space.

TABLE 1

Halon	Minimum	Maximum
1301 (BTM)	5 per cent	7 per cent
1211 (BCF)	5 per cent	5.5 per cent

The volume of Halon 1301 (BTM) shall be calculated at 0.16 cubic metres per kilogramme and the volume of Halon 1211 (BCF) shall be calculated at 0.14 cubic metres per kilogramme.

- (x) The quantity of extinguishing medium for machinery spaces shall be calculated in accordance with the following table 2. This quantity shall be based on the gross volume of the space in respect of the minimum concentration and the net volume of the space in respect of the maximum concentration, including the casing.

TABLE 2

Halon	Minimum	Maximum
1301 (BTM)	4.25 per cent	7 per cent
1211 (BCF)	4.25 per cent	5.5 per cent

The volume of Halon 1301 (BTM) shall be calculated at 0.16 cubic metres per kilogramme and the volume of Halon 1211 (BCF) shall be calculated at 0.14 cubic metres per kilogramme.

- (c) Where the medium is Halon 1301 (BTM), the storage containers may be permitted within a protected machinery space other than a pumproom provided that the arrangements comply with the following requirements:
- (i) The containers shall be individually distributed throughout the protected space having regard to the appropriate requirements of paragraph (1)(c) of this Schedule.
 - (ii) A manually initiated power release, located outside the protected space, shall be provided. Duplicate sources of power shall be provided for this release and shall be located outside the protected space and be immediately available except that for machinery spaces, one of the sources of power may be located inside the protected space.
 - (iii) The sources of pneumatic and hydraulic pressure and of electrical power shall be monitored for loss of pressure or power as appropriate and electrical circuits essential for the release of the medium from the containers shall be monitored for all fault conditions. Visual and audible alarms shall be provided to indicate this. Pneumatic or hydraulic power circuits connecting the containers shall be duplicated.
 - (iv) Within the protected space, electrical circuits essential for the release of the medium shall be mineral insulated cable or other equivalent material. Hydraulic and pneumatic piping systems essential for the release of the medium shall be of steel or other equivalent heat resisting material.
 - (v) Each container shall be fitted with an automatic over-pressure device which will safely vent the contents of the container into the protected space in the event of overpressure caused by the container being exposed to a fire and inoperation or failure of the power.
 - (vi) The arrangements of the containers and the electric circuits and piping essential for the release of the medium shall be such that in the event of damage at any one location in a circuit through fire or explosion, i.e. a single fault concept at least two-thirds of the quantity of medium required for that space in accordance with paragraph 3(b)(ix) or 3(b)(x) of this Schedule can still be discharged at will, having regard to the requirement for uniform distribution of medium throughout the space. In small compartments, the Secretary of state may permit only one or two containers if he is satisfied with the storage and release arrangements.
 - (vii) Not more than two discharge nozzles shall be fitted to any pressure container and the maximum quantity of agent in each container shall be to the satisfaction of the Secretary of State having regard to the requirement for uniform distribution of medium throughout the space.
 - (viii) The containers shall be monitored for decrease in pressure due to leakage and discharge. Visual and audible alarms in the protected area and on the navigation bridge or at the control station shall be provided to indicate this condition, except that for cargo spaces alarms need only be provided on the navigation bridge or the control station.
- (d) Local automatically operated units containing Halon 1301 (BTM) or Halon 1211 (BCF) fitted in enclosed areas of high fire risk within machinery spaces in addition to and independent of any required fixed fire extinguishing system may be accepted provided the units comply with the following requirements:

- (i) The space in which such additional local protection is provided should be on one working level and on the same level as the access. At the discretion of the Secretary of State more than one working level may be permitted subject to an access being provided on each level.
 - (ii) The escape arrangements shall be such that escape from anywhere in such protected spaces can be effected in not more than ten seconds.
 - (iii) The operation of any unit shall be indicated by visual and audible alarms outside each access into the space and at the navigating bridge or at the control station.
 - (iv) A notice stating that the space contains one or more automatically operated units and the name of the medium used shall be displayed outside each access to the space.
 - (v) The time to discharge the liquid phase of the medium in any local automatically operated unit shall not exceed ten seconds.
 - (vi) The arrangements of such units shall be such that release of the medium from any unit does not result in the loss of electrical power or reduction in the manoeuvrability of the ship.
 - (vii) The total quantity of medium provided in such units within a protected space shall be such that the maximum vapour concentration at 20°C as specified in sub-paragraph (3)(b)(x) of this Schedule is not exceeded when all such units operate; provided that the concentration may be exceeded where such units are operated together with a fixed system fitted in compliance with paragraph (3)(b) of this Schedule.
 - (viii) Every such unit shall comply with paragraphs (1)(k), (3)(b)(vi), (3)(b)(vii) and (3)(b)(viii) of this Schedule.
- (e) Local automatically operated units fitted in machinery spaces over equipment having high fire risk in addition to and independent of any required fixed fire extinguishing system may be accepted provided that they comply with the following requirements:—
- (i) The total quantity of medium provided in such units within the machinery space shall be such that the maximum vapour concentration of 1.25 per cent of the gross volume of that space is not exceeded when all such units operate simultaneously.
 - (ii) Every such unit shall comply with paragraphs 1(k), 3(b)(vii) (except that uniform distribution of the medium may not be required), (3)(b)(viii), (3)(d)(iii), (3)(d)(iv), (3)(d)(v), (3)(d)(vi) and (3)(d)(viii) of this Schedule.

Other gas systems

- (4) (a) Where gas other than carbon dioxide or halogenated hydrocarbon is produced on the ship and is used as an extinguishing medium, it shall be a gaseous product of fuel combustion in which the oxygen content, the carbon monoxide content, the corrosive elements and any solid combustible elements have been reduced to a permissible minimum. Any system using such gas shall afford equivalent protection to that provided by a fixed carbon dioxide system.
- (b) When a system producing inert gas is used to provide extinguishing gas in a fixed fire extinguishing system for cargo spaces, except cargo oil tanks, in compliance with these Regulations it shall be capable of producing hourly a volume of free gas at least equal to 25 per cent of the gross volume of the largest compartment protected in this way for a period of 72 hours.
- (c) No part of the control, storage or generating arrangement of any fixed fire extinguishing system shall be situated forward of the collision bulkhead in any passenger ship.

SCHEDULE 11

Regulations 10(1)(a), (2) and (3), 36(1), (2) and (3), 86(1)(b), 88(a), 1021(1)(b)
104(a), 123(1), (2) and (3), 141 and 143(6)(f)

Fixed Fire Detection and Fire Alarm Systems

General requirements

- (1) (a) Any required fixed fire detection and fire alarm system with manually operated call points shall be capable of immediate operation at all times.
- (b) Power supplies and electric circuits necessary for operation of the system shall be monitored for loss of power or fault conditions as appropriate. Occurrence of a fault condition shall initiate a visual and audible fault signal at the control panel which shall be distinct from a fire signal.
- (c) There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire detection and fire alarm system, one of which shall be an emergency source. The supply shall be provided by separate feeders reserved solely for that purpose. Such feeders shall run to an automatic change-over switch situated in or adjacent to the control panel for the fire detection system.
- (d) Detectors and manually operated call points shall be grouped into sections. The activation of any detector or manually operated call point shall initiate a visual and audible fire signal at the control panel and indicating units. If the signals have not received attention within two minutes an audible alarm shall be automatically sounded throughout the crew accommodation and service spaces, control stations and machinery spaces of Category A. This alarm sounder system need not be an integral part of the detection system.
- (e) The control panel shall be located on the navigating bridge or in the main fire control station.
- (f) Indicating units shall denote the section in which a detector or manually operated call point has operated. At least one unit shall be so located that it is easily accessible to responsible members of the crew at all times, when at sea or in port except when the ship is out of service. One indicating unit shall be located on the navigating bridge if the control panel is located in the main fire control station.
- (g) Clear information shall be displayed on or adjacent to each indicating unit about the spaces covered and the location of the sections.
- (h) No section covering more than one deck within accommodation spaces, service spaces and control stations shall be permitted except a section which covers an enclosed stairway. In order to avoid delay in identifying the source of fire, each section shall contain not more than 100 detectors and shall cover not more than 50 rooms.
- (i) In passenger ships a section of detectors shall not serve spaces on both sides of the ship nor on more than one deck and neither shall it be situated in more than one main vertical zone except that the Secretary of State, if he is satisfied that the protection of the ship against fire will not thereby be reduced, may permit such a section of detectors to serve both sides of the ship and more than one deck.
- (j) A section of fire detectors covering a control station, service space, accommodation space or cargo space shall not include a machinery space of Category A.
- (k) Detectors shall be operated by heat, smoke or other products of combustion, flame or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be accepted by the Secretary of State provided that they are no less sensitive than such detectors. Flame shall be used only as additional to smoke or heat detectors.

- (l) Suitable instructions and spare components for testing and maintenance shall be provided.
- (m) The function of the detection system shall be periodically tested to the satisfaction of the Secretary of State by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond. All detectors shall be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.
- (n) The fire detection system shall not be used for any other purpose except that closing of fire doors and similar functions may be permitted at the control panel.

Installation requirements

- (2) (a) Manually operated call points shall be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point shall be located at each exit. Manually operated call points shall be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 metres from a manually operated call point.
- (b) Smoke detectors shall be installed in all stairways, corridors and escape routes within accommodation spaces.
- (c) Where a fixed fire detection and fire alarm system is required for the protection of spaces other than those specified in paragraph (2) (b) of this Schedule at least one detector complying with paragraph (1) (k) of this Schedule shall be installed in each such space.
- (d) Detectors shall be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely shall be avoided. In general, detectors which are located in overhead positions shall be a minimum distance of 0.5 metre away from bulkheads.
- (e) The maximum spacing of detectors shall be in accordance with the table below:

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m ²	9 m	4.5 m
Smoke	74 m ²	11 m	5.5 m

The Secretary of State may require or permit other spacings based upon test data which demonstrate the characteristics of the detectors.

- (f) Electrical wiring which forms part of the system shall be so arranged as to avoid galleys, machinery spaces of Category A, and other enclosed spaces of high fire risk except where it is necessary to provide for fire detection or fire alarm in such spaces or to connect to the appropriate power supply.

Design requirements

- (3) (a) The system and equipment shall be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships.
- (b) Smoke detectors required by paragraph (2) (b) shall be certified to operate before the smoke density exceeds 12.5 per cent. obscuration per metre, but not to operate until the smoke density exceeds 2 per cent. obscuration per metre. Smoke detectors to be installed in other spaces shall operate within sensitivity limits to the satisfaction of the Secretary of State having regard to

the avoidance of detector insensitivity or over-sensitivity.

- (c) Heat detectors shall be certified to operate before the temperature exceeds 78°C but not to operate until the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector shall operate within temperature limits to the satisfaction of the Secretary of State having regard to the avoidance of detector insensitivity or oversensitivity.
- (d) The permissible temperature of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

Special requirements for periodically unattended machinery spaces

(4) For periodically unattended machinery spaces the fixed fire detection and fire alarm system shall comply with the following additional requirements:

- (a) This fire detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigating bridge and by a responsible engineer officer. When the navigating bridge is unmanned the alarm shall sound in a place where a responsible member of the crew is on duty.
- (b) After installation the system shall be tested under varying conditions of engine operation and ventilation.

Special requirements for cargo spaces

(5) In cargo spaces the system shall comply with the following additional requirements:—

- (a) Detectors shall be grouped into separate sections such that a section shall cover not more than one cargo space. Each section shall contain not more than 100 detectors.
- (b) The type, number and spacing of detectors shall be to the satisfaction of the Secretary of State taking into account the conditions of ventilation and other factors prevailing in the space in which the detectors are installed.
- (c) In special category spaces and ro-ro cargo spaces, the system shall be capable of rapidly detecting the onset of fire. After being installed, the system shall be tested under normal ventilation conditions and shall give an overall response time to the satisfaction of the Secretary of State.

SCHEDULE 12

Regulations 10(2), 36(3), 88(a), 104(a) and 143(6)(f)

Sample Extraction Smoke Detection Systems

General requirements

- (1) (a) Wherever in the text of this Schedule the word “system” appears, it shall mean “sample extraction smoke detection system”.
- (b) Any required system shall be capable of continuous operation, at all times except that systems operating on a sequential scanning principle may be accepted, provided that the interval between scanning the same position twice gives an overall response time to the satisfaction of the Secretary of State.

- (c) Power supplies necessary for the operation of the system shall be monitored for loss of power. Occurrence of loss of power shall initiate a visual and audible signal at the control panel and the navigating bridge which shall be distinct from a signal indicating smoke detection.
- (d) An alternative power supply for the electrical equipment used in the operation of the system shall be provided.
- (e) The control panel shall be located on the navigating bridge or in the main fire control station.
- (f) The detection of smoke or other products of combustion shall initiate a visual and audible signal at the control panel and the navigating bridge.
- (g) Clear information shall be displayed on or adjacent to the control panel designating the spaces covered.
- (h) The sampling pipe arrangements shall be such that the location of the fire can be readily identified.
- (i) Suitable instructions and spare components shall be provided for the testing and maintenance of the system.
- (j) The function of the system shall be periodically tested to the satisfaction of the Secretary of State. The system shall be of a type that can be tested for correct operation and restored to normal surveillance without the renewal of any component.
- (k) The system shall be designed, constructed and installed so as to prevent the leakage of any toxic or flammable substances or fire extinguishing medium into any accommodation space, service space, control station or machinery space.

Installation requirements

- (2) (a) At least one smoke accumulator shall be located in every enclosed space for which smoke detection is required. However, where space is designed to carry oil or refrigerated cargo alternatively with cargoes for which a smoke sampling system is required, means may be provided to isolate the smoke accumulators in such compartments for the system. Such means shall be to the satisfaction of the Secretary of State.
- (b) Smoke accumulators shall be located for optimum performance and shall be spaced so that no part of the overhead deck area is more than 12 metres measured horizontally from an accumulator. Where systems are used in spaces which may be mechanically ventilated, the position of the smoke accumulators shall be considered having regard to the effects of ventilation.
- (c) Smoke accumulators shall be positioned where impact or physical damage is unlikely to occur.
- (d) Not more than four accumulators shall be connected to each sampling point.
- (e) Smoke accumulators from more than one enclosed space shall not be connected to the same sampling point.
- (f) Sampling pipes shall be self-draining and suitably protected from impact or damage from cargo working.

Design requirements

- (3) (a) The system and equipment shall be suitably designed to withstand supply voltage variations and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships and to avoid the possibility of ignition of flammable gas/air mixtures.
- (b) The sensing unit shall be certified to operate before the smoke density within the sensing chamber exceeds 6.65 per cent obscuration per metre.
- (c) Duplicate sample extraction fans shall be provided. The fans shall be of sufficient capacity to operate with the normal conditions of ventilation in the protected area and shall give an overall response time to the satisfaction of the Secretary of State.
- (d) The control panel shall permit observation of smoke in the individual

- sampling pipe.
- (e) Means shall be provided to monitor the airflow through the sampling pipes and to ensure that as far as practicable equal quantities are extracted from each interconnected accumulator.
 - (f) Sampling pipes shall be a minimum of 12 millimetres internal diameter except when used in conjunction with fixed gas fire extinguishing systems when the minimum size of pipe should be sufficient to permit the fire extinguishing gas to be discharged within the appropriate time.
 - (g) Sampling pipes shall be provided with an arrangement for periodically purging with compressed air.

SCHEDULE 13

Regulation 49(1)

Fixed Deck Foam System

- (1) The arrangements for providing foam shall be capable of delivering foam to the entire cargo tanks deck area as well as into any cargo tank, the deck of which has been ruptured.
- (2) The deck foam system shall be capable of simple and rapid operation. The main control station for the system shall be suitably located outside the cargo area adjacent to the accommodation spaces and readily accessible and operable in the event of fire in the areas protected.
- (3) The rate of supply of foam solution (that is, the mixture of foam concentrate and water before expansion) shall be not less than the following whichever is the greatest:
 - (a) 0.6 litre per minute per square metre of cargo tanks deck area, where cargo tanks deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces;
 - (b) 6 litres per minute per square metre of the horizontal sectional area of the single tank having the largest such area; or
 - (c) 3 litres per minute per square metre of the area protected by the largest monitor, such area being entirely forward of the monitor, but not less than 1,250 litres per minute.
- (4) Sufficient foam concentrate shall be supplied to ensure at least 20 minutes of foam generation in ships fitted with an inert gas system complying with Schedule 14 to these Regulations or 30 minutes of foam generation in ships not fitted with an inert gas system when using the solution rates stipulated in paragraph (3) of this Schedule. The foam expansion ratio (that is, the ratio of the volume of foam produced to the volume of the mixture of foam concentrate and water before expansion) shall not generally exceed 12 to 1.
- (5) Foam from the fixed foam system shall be supplied by means of monitors and foam applicators. At least 50 per cent of the foam solution rate required in sub-paragraphs (a) and (b) of paragraph (3) of this Schedule shall be delivered from each monitor. On tankers of less than 4,000 tonnes deadweight, applicators may be substituted for an installation of monitors. In such a case the capacity of each applicator shall be at least 25 per cent of the foam solution rate required in sub-paragraph (a) or (b) of paragraph (3) of this Schedule.
- (6)
 - (a) The number and position of monitors shall be such as to comply with paragraph (1) of this Schedule. The capacity of any monitor shall be at least 3 litres per minute of foam solution per square metre of deck area protected by that monitor, such area being entirely forward of the monitor. Such capacity shall be not less than 1,250 litres per minute.
 - (b) The distance from the monitor to the farthest extremity of the protected area

forward of that monitor shall not be more than 75 per cent of the monitor throw in still air conditions.

(7) A monitor and hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck. On tankers of a deadweight of less than 4,000 tonnes not fitted with monitors a hose connection for a foam applicator shall be situated both port and starboard at the front of the poop or accommodation spaces facing the cargo tanks deck.

(8) The capacity of any applicator shall be not less than 400 litres per minute and the applicator throw in still air conditions shall be not less than 15 metres. The number of foam applicators provided in accordance with the requirements of paragraph (5) of this Schedule, shall be not less than four. The number and disposition of foam main outlets shall be such that foam from at least two applicators can be directed on to any part of the cargo tank deck area.

(9) Valves shall be provided in the foam main, and in the fire main when this is an integral part of the deck foam system, immediately forward of any monitor position to isolate damaged sections of those mains.

(10) Operation of a deck foam system at its required output shall permit the simultaneous use of the minimum required number of jets of water at the required pressure from the fire main.

SCHEDULE 14

Regulations 49(2) and 5(a) and 50(2)

Inert Gas Systems

(1) Every inert gas system provided in accordance with these Regulations shall be designed, constructed and tested to the satisfaction of the Secretary of State.

(2) The system shall be capable of:

- (a) inerting empty cargo tanks including slop tanks by reducing the oxygen content of the atmosphere in each tank to a level at which combustion cannot be supported;
- (b) maintaining the atmosphere in any part of any cargo tank or slop tank at an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times both in port and at sea except when it is necessary for such a tank to be gas free;
- (c) eliminating the need for air to enter a tank during normal operations except when it is necessary for such a tank to be gas free;
- (d) purging empty cargo tanks including slop tanks of hydrocarbon gas, so that subsequent gas freeing operations will at no time create a flammable atmosphere within the tank.

- (3) (a) The system shall be capable of delivering inert gas to the cargo tanks and slop tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship, expressed as a volume;
- (b) the system shall be capable of delivering inert gas with an oxygen content of not more than 5 per cent by volume in the inert gas supply main to the cargo tanks and slop tanks at any required rate of flow.

(4) The inert gas supply may be treated flue gas from the main or auxiliary boilers, from one or more separate gas generators or other sources or from any combination thereof. The Secretary of State may approve systems using inert gases other than flue gas, provided he is satisfied that an equivalent standard of safety is achieved. Systems using stored carbon dioxide shall not be permitted unless the Secretary of State is satisfied that the risk of ignition from generation of static electricity by the system itself is minimised.

- (5) Flue gas isolating valves shall be fitted in the inert gas supply mains between the boiler uptakes and the flue gas scrubber. These valves shall be provided with indicators to show whether they are open or shut, and precautions shall be taken to maintain them gas-tight and keep the seating clear of soot. Arrangements shall be made so that boiler soot blowers cannot be operated when the corresponding flue gas valve is open.
- (6) (a) A flue gas scrubber shall be fitted which will effectively cool the volume of gas specified in paragraph (3) of this Schedule and remove solids and sulphur combustion products. The cooling water arrangements shall be such that an adequate supply of water will always be available without interfering with any essential services on the ship. Provision shall also be made for an alternative supply of cooling water.
- (b) Filters or equivalent devices shall be fitted to minimise the amount of water carried over to the inert gas blowers.
- (c) The scrubber shall be located aft of all cargo tanks, slop tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of Category A.
- (7) (a) At least two blowers shall be fitted which together shall be capable of delivering to the cargo tanks and slop tanks, at least the volume of gas required by paragraph (3) of this Schedule. In a system provided with a gas generator, the Secretary of State may permit only one blower if that system is capable of delivering the total volume of gas required by paragraph (3) to the protected cargo tanks, provided that sufficient spares for the blower and its prime mover are carried on board to enable any failure of the blower and its prime mover to be rectified by the ship's crew.
- (b) Two fuel oil pumps shall be fitted to the inert gas generator. The Secretary of State may permit only one fuel oil pump on condition that sufficient spares for the fuel oil pump and its prime mover are carried on board to enable any failure of the fuel oil pump and its prime mover to be rectified by the ship's crew.
- (c) The inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. Suitable shut-off arrangements shall be provided on the suction and discharge connexions of each blower. Arrangements shall be provided to enable the functioning of the inert gas plant to be stabilised before commencing cargo discharge. If the blowers are to be used for gas freeing, their air inlets shall be provided with blanking arrangements.
- (d) The blowers shall be located aft of all cargo tanks, cargo pump rooms and cofferdams separating these spaces from machinery spaces of Category A.
- (8) (a) The design and location of scrubber and blowers with relevant piping and fittings shall be such as to prevent flue gas leakages into enclosed spaces
- (b) To permit safe maintenance, an additional water seal or other effective means of preventing flue gas leakage shall be fitted between the flue gas isolating valves and scrubber or incorporated in the gas entry to the scrubber.
- (9) (a) A gas regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required in paragraph (19)(c) and (19)(d) of this Schedule. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless means are provided to automatically control the speed of the inert gas blowers required in paragraph (7) of this Schedule.
- (b) The valve referred to in sub-paragraph (a) of this paragraph shall be located at the forward bulkhead of the most forward gas safe space through which the inert gas supply main passes.
- (10) (a) At least two non-return devices, one of which shall be a water seal, shall be fitted in the inert gas supply main, in order to prevent the return of hydrocarbon vapour to the machinery spaces uptakes or to any gas safe spaces under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph (9) of this Schedule and the aftermost connection to any cargo tank or cargo pipeline.

- (b) The devices referred to in this paragraph shall be located in the cargo area on deck.
 - (c) The water seal referred to in sub-paragraph (a) of this paragraph shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times.
 - (d) The arrangement of the seal and its associated provisions shall be such that it will prevent back-flow of hydrocarbon vapours and will ensure the proper functioning of the seal under operating conditions.
 - (e) Provision shall be made to ensure that the water seal is protected against freezing, in such a way that the integrity of the seal is not impaired by overheating.
 - (f) A water loop or other arrangement approved by the Secretary of State shall also be fitted to all associated water supply and dry piping and all venting or pressure sensing piping leading to gas safe spaces. Means shall be provided to prevent such loops from being emptied by vacuum.
 - (g) The deck water seal and all loop arrangements shall be capable of preventing return of hydrocarbon vapours at a pressure equal to the test pressure of the cargo tanks.
 - (h) The second non-return device mentioned in sub-paragraph (a) of this paragraph shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted forward of the deck water seal required by sub-paragraph (a) of this paragraph. It shall be provided with either positive means of closure or an additional valve having such means of closure located forward of the non-return valve to isolate the deck water seal from the inert gas main to the cargo tanks and slop tanks.
 - (i) As an additional safeguard against the possible leakage of hydrocarbon liquids or vapours back from the deck main, means shall be provided to permit the section of the line between the valve having positive means of closure referred to in sub-paragraph (h) of this paragraph, and the valve referred to in paragraph (9) of this Schedule to be vented in a safe manner when the first of these valves is closed.
- (11) (a) The inert gas main may be divided into two or more branches forward of the non-return devices required by paragraph (10) of this Schedule.
- (b) (i) The inert gas supply main shall be fitted with branch piping leading to each cargo tank and slop tank. Branch piping for inert gas shall be fitted with either stop valves or equivalent means of control for isolating each tank. Where stop valves are fitted, they shall be provided with locking arrangements, which shall be under the control of a responsible ship's officer.
 - (ii) In combination carriers, the arrangements to isolate the slop tanks containing oil or oil residues from other tanks shall consist of blank flanges which will remain in position at all times when cargoes other than oil are being carried except as provided for in the relevant section of the Guide-lines on Inert Gas Systems.
 - (c) Means shall be provided to protect cargo tanks and slop tanks against the effect of over-pressure or vacuum caused by thermal variations when such tanks are isolated from the inert gas main.
 - (d) Piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions.
 - (e) Suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas.
- (12) The arrangements for the venting of all vapours displaced from the cargo tanks during loading or ballasting shall comply with regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984 and shall consist of either one or more mast risers, or a number of high velocity vents. The inert gas supply main may be used for such venting.

(13) The arrangements for inerting, purging or gas freeing of empty tanks as required in paragraph (2) of this Schedule shall be approved by the Secretary of State and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimised and that:

- (a) on individual cargo tanks or slop tanks the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984. The inlet of such outlet pipes may be located at either deck level or at not more than 1 metre above the bottom of the tank;
 - (b) the cross sectional area of such a gas outlet pipe referred to in sub-paragraph (a) of this paragraph shall be such that an exit velocity of at least 20 metres per second can be maintained when any three tanks are being simultaneously supplied with inert gas. Their outlets shall extend not less than 2 metres above deck level;
 - (c) each gas outlet referred to in sub-paragraph (b) of this paragraph shall be fitted with suitable blanking arrangements;
 - (d) (i) if a connection is fitted between the inert gas supply main and the cargo piping system, arrangements shall be made to ensure an effective isolation having regard to the high pressure difference which may exist between the systems. This shall consist of two shut-off valves with an arrangement to vent the space between the valves in a safe manner or an arrangement consisting of a spool-piece with associated blanks;
 - (ii) the valve separating the inert gas supply main from the cargo main shall be a non-return valve with a positive means of closure.
- (14) (a) One or more pressure-vacuum breaking devices shall be provided to prevent the cargo tanks from being subject to:
- (i) a positive pressure in excess of the test pressure of the cargo tank if the cargo were to be loaded at the maximum rated capacity and all other outlets were left shut: and
 - (ii) a negative pressure in excess of 700 millimetres water gauge if cargo were to be discharged at the maximum rated capacity of the cargo pumps and the inert gas blower were to fail. Such devices shall be installed on the inert gas main unless they are installed in the venting system required by Regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984 or on individual cargo tanks.
- (b) The location and design of the devices referred to in sub-paragraph (a) of this paragraph shall be in accordance with regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984.

(15) Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the gas blowers, whenever those gas blowers are operating.

- (16) (a) Instrumentation shall be fitted for continuously indicating and permanently recording when the inert gas is being supplied:
- (i) the pressure of the inert gas supply main forward of the non-return devices required by sub-paragraph (a) of paragraph (10) of this Schedule; and
 - (ii) the oxygen content of the inert gas in the inert gas supply main on the discharge side of the gas blowers.
- (b) The devices referred to in sub-paragraph (a) of this paragraph shall be placed in the cargo control room where provided. Where no cargo control room is provided, they shall be placed in a position easily accessible to the officer in charge of cargo operations.
- (c) In addition, meters shall be fitted:
- (i) in the navigating bridge, to indicate at all times the pressure referred to in sub-paragraph (a)(i) of this paragraph and the pressure in the slop

tanks of combination carriers, whenever those tanks are isolated from the inert gas supply main; and

- (ii) in the machinery control room or in the machinery space, to indicate the oxygen content referred to in sub-paragraph (a)(ii) of this paragraph.

(17) Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank and slop tank such that the condition of the tank atmosphere can be determined using these portable instruments.

(18) Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs (16) and (17) of this Schedule.

(19) (a) Audible and visual alarms shall be provided to indicate:

- (i) low water pressure or low water flow rate to the flue gas scrubber referred to in sub-paragraph (6)(a) of this Schedule;
 - (ii) high water level in the flue gas scrubber referred to in sub-paragraph (6)(a) of this Schedule;
 - (iii) high gas temperature referred to in paragraph (15) of this Schedule;
 - (iv) failure of the inert gas blowers referred to in sub-paragraph (7)(a) of this Schedule;
 - (v) oxygen content in excess of 8 per cent volume referred to in sub-paragraph (16)(a)(ii) of this Schedule;
 - (vi) failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices referred to in paragraph (9) and sub-paragraph (16)(a) respectively of this Schedule;
 - (vii) low water level in the water seal referred to in sub-paragraph (10)(a) of this Schedule;
 - (viii) gas pressure less than 100 millimetres water gauge as referred to in sub-paragraph (16)(a)(i) of this Schedule; the alarm arrangement for this gas pressure shall be such as to ensure that the pressure in slop tanks in combination carriers can be monitored at all times; and
 - (ix) high gas pressure referred to in sub-paragraph (16)(a)(i) of this Schedule.
- (b) In the system with gas generators, audible and visual alarms shall be provided in accordance with sub-paragraph (19)(a)(i), (19)(a)(iii), (19)(a)(v) and (19)(a)(ix) of this paragraph and additional alarms to indicate:
- (i) insufficient fuel oil supply;
 - (ii) failure of the power supply to the generator;
 - (iii) failure of the power supply to the automatic control system for the generator.
- (c) Automatic shut down of the inert gas blowers and gas regulating valve shall be arranged on predetermined limits being reached in respect of sub-paragraph (a)(i), (a)(ii) and (a)(iii) of this paragraph.
- (d) Automatic shut down of the gas regulating valve shall be arranged so as to take account of failure of the inert gas blowers referred to in paragraph (7) of this Schedule.
- (e) In relation to sub-paragraph (a)(v) of this paragraph, when the oxygen content of the inert gas exceeds 8 per cent, immediate action shall be taken to reduce the oxygen level. Unless the quality of the gas improves, all in-tank operations shall be suspended so as to avoid air being drawn into the tanks and the isolation valve referred to in sub-paragraph (10)(h), of this Schedule shall be closed.
- (f) The alarms required in sub-paragraphs (a)(v), (a)(vi) and (a)(viii) of this paragraph shall be fitted in the machinery space and cargo control room, where provided, but in any event in such a position that they are immediately received by responsible members of the crew.

- (g) In relation to sub-paragraph (a)(vii) of this paragraph the Secretary of State shall be satisfied as to the maintenance of an adequate reserve of water at all times and the integrity of the arrangements to permit the automatic formation of the water seal when the gas flow ceases. The audible and visual alarm on the low level of water in the water seal shall operate when the inert gas is not being supplied.
- (h) An audible alarm system, independent of that required in sub-paragraph (a)(viii) of this paragraph, or automatic shut down of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas main being reached.

(20) A detailed instruction manual shall be provided on board by the owner and it shall cover the operational safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manual shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system as detailed in the Guidelines for Inert Gas Systems.

EXPLANATORY NOTE

(This Note is not part of the Regulations.)

These Regulations give effect in relation to new United Kingdom ships to the provisions of Chapter 11-2 of the Amendments to the International Convention for the Safety of Life at Sea 1974 adopted by the Maritime Safety Organisation at its forty-fifth Session for ships constructed on or after 1st September 1984.

They include requirements which, in relation to existing ships, are contained in the Merchant Shipping (Fire Appliances) Regulations 1980(S.I. 1980/544) as amended and (in respect of structural fire protection) in the Merchant Shipping (Passenger Ship Construction) Regulations 1980(S.I. 1980/535) as amended and the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1981(S.I. 1981/572) as amended.

The principal changes from those Regulations are:

1. a requirement for minimum fire pump size;
2. a requirement for dual purpose fire hoze nozzles in all locations;
3. a requirement for a larger number of firemen's outfits for some tankers;
4. more onerous requirements for emergency fire pumps;
5. a reduction in the number of spare charges required for portable fire extinguishers
6. more onerous requirements for structural fire protection on cargo ships;
7. further requirements for ships carrying dangerous goods.

The Merchant Shipping Notices are obtainable from the Department of Transport Library, Sunley House, 90 High Holborn, London WC1V 6LP, and from any Department of Transport Marine Office.

Copies of the British Standards specifications referred to in these Regulations may be obtained from any of the sales outlets operated by the British Standards Institution, or by post from the British Standards Institution at Linford Wood, Milton Keynes, MK14 6L (Telephone Number: Milton Keynes (STD 0908) 320066).

IMO Publications are obtainable from the International Maritime Organization, 4 Albert Embankment, London SE1 7SR.

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