STATUTORY INSTRUMENTS

1980 no. 544

MERCHANT SHIPPING

SAFETY

THE MERCHANT SHIPPING (FIRE APPLIANCES) REGULATIONS 1980

*(Text of the Regulations as they have effect in the Isle of Man. Amendments are indicated by **bold italics**)*

THESE REGULATIONS APPLY TO SHIPS THE KEELS OF WHICH WERE LAID 25TH MAY 1980 - 31st AUGUST 1984

MANX EXTENDING INSTRUMENT	*UK S.I.s APPLIED*
Merchant Shipping (Safety Provisions) (Application) Order 1985 (GC 38/85)	S.I. 1980/544 S.I. 1981/574
Merchant Shipping (Safety Provisions) (Application) (No.2) Order 1985 (GC 357/85)	S.I. 1985/1194
Merchant Shipping (Safety Provisions) (Application) (No.2) Order 1986 (GC 334/86)	S.I. 1986/1074
Merchant Shipping (Safety Provisions) (Application) Order 1993 (SD 247/93)	S.I. 1993/1072
Merchant Shipping (Safety Provisions) (Application) Order 1994 (SD 464/94)	S.I. 1993/3162

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1980 no. 544

MERCHANT SHIPPING

SAFETY

THE MERCHANT SHIPPING (FIRE APPLIANCES) REGULATIONS 1980

Made	*17th April 1980*
Laid before Parliament	*2nd May 1980*
Coming into Operation	*25th May 1980*

ARRANGEMENT OF REGULATIONS

PART I - PRELIMINARY

PART II - PASSENGER SHIPS

PART IV - GENERAL

SCHEDULES

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), (3)(a), (d), (j), and (o), (5), (6)(a) and (b) of section 21 and by section 22(1)(a) and (c) of that Act, and of all other powers enabling him in that behalf, hereby makes the following Regulations -

PART I - PRELIMINARY

Citation, commencement, interpretation, and application

1.- (1) These Regulations may be cited as the Merchant Shipping (Fire Appliances) Regulations 1980 and shall come into operation on ***1st July 1985.***

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

"Accommodation spaces" means passenger spaces, public spaces, corridors, lavatories, cabins, offices, crew spaces, shops, hospitals, cinemas, games and hobbies rooms, isolated pantries containing no cooking appliances and similar spaces;

"approved" means approved by the ***Department of Trade and Industry;***

"Bulkhead deck" is the uppermost deck up to which the transverse water-tight bulkheads are carried;

"Cargo ship" means any ship which is not a passenger ship;

(a) 1979 c. 39

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

"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 Chapter VI of the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;

"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;

"Control station" includes those spaces in which the ship's radio or main navigating equipment, or the emergency source of power are located or where the fire detection or fire control equipment is centralised;

"Crew Space" means crew accommodation within the meaning of ***the Merchant Shipping (Crew Accommodation) Regulations 1978*** [(b)] ***;***

"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 and Marine Pollutants)*** Regulations ***1991*** [(c)] ***;***

"Deadweight" means the difference in tonnes between the displacement of a ship at summer load line and the lightweight of the ship;

"Fishing vessel" means a vessel used for catching, otherwise than for sport, fish, whales, seals, walrus or other living resources of the sea and includes a fishery research vessel;

"Gas carrier" means a tanker constructed or adapted and used for the carriage in bulk of any liquefied gas or other substance of a flammable nature listed in Chapter XIX of the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;

"Gas safe place" is a space into which the entry of hydrocarbon gases or other gases of a flammable nature have been restricted;

(b) S.I. 1978/795 ***(c) GC 161/91***

"Guidelines for Inert Gas Systems" (MSC/Circ 353) forms part of the publication "Inert Gas Systems" 1983 edition published by the International

Maritime Organization and any reference to such publication in these Regulations 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;

"I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk" is published by the Inter-governmental Maritime Consultative Organisation;

"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 or stores and passengers and crew and their effects;

"Machinery spaces of Category A" are all spaces which contain -

(a) internal combustion type machinery used either for main propulsion purposes, or for other purposes where such machinery has in the aggregate a total power output of not less than 375 kW; or

(b) any oil-fired boiler or oil-fired unit; and trunks to such spaces;

"machinery spaces" are all machinery spaces of Category A and all other spaces containing propelling 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 trunks to such spaces;

"Merchant shipping notice" means a Notice described as such and issued by the Department of Trade;

"New ship" means a ship the keel of which is laid or which is at a similar stage of construction on or after 25th May 1980;

"Oil-fired boiler" means any boiler wholly or partly fired by liquid fuel not being a domestic boiler of less than 73.2 kW;

"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 kilogrammes per square centimetre;

"passenger space" means space provided for the use of passengers;

"Passenger ship" means a ship carrying more than 12 passengers;

Definition of Pleasure Vessel as amended by SD 396/03 MS (Pleasure Vessel) Regulations 2003

"Pleasure Vessel" means any vessel which at the time it is being used:

(a) is wholly owned by an individual or individuals, and is used only for the sport or pleasure of the owner or the immediate family or friends of the owner; or

(b) is owned by a body corporate, and is carrying only such persons as are the employees or officers of the body corporate, or their immediate family or friends; and

(c) is on a voyage or excursion which is one for which the owner does not receive money or money's worth for or in connection with the operation of the vessel or the carrying of any person other than as a contribution to the direct expenses of the operation of the vessel incurred during the voyage or excursion, and no other payments are made by, on behalf of, or for the benefit of users of the vessel, other than by the owner; or

(d) is owned by a body corporate but pursuant to a long term lease agreement, is used only for the sport or pleasure of the lessee, and the immediate friends or family of the lessee, if an individual, or the employees or officers and their immediate friends and family, if a corporate lessee.

Such lease agreement must specify that:

(i) the vessel may only be used for private purposes and must not be used for commercial purposes;

(ii) the vessel must not be sub-leased or chartered, and

(iii) no other payments are made by, on behalf of, or for the benefit of users of the vessel, other than by the lessee.

(e) is wholly owned by or on behalf of a members' club formed for the purpose of sport or pleasure, and at the time it is being used, is used only for the sport or pleasure of members of that club or their immediate family, and any charges levied in respect of that use are paid into club funds and applied for the general use of the club, and no other payments are made by, on behalf of, or for the benefit of users of the vessel, other than by the club.

"Protocol of 1978" means the Protocol of 1978 relating to the International Convention for the Safety of Life at Sea 1974 (Cmnd No 7346);

"Public spaces" are spaces used for halls, dining rooms, lounges and similarly permanently enclosed spaces;

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

"relevant standard of a member State other than the United Kingdom", in relation to a reference to an International Standard or a British Standard, means-

(a) a relevant standard or code of practice of a national standards body or equivalent body of a member State other than the United Kingdom; or

(b) a relevant international standard recognised for use in a member State other than the United Kingdom; or

(c) a relevant specification acknowledged for use as a standard by a public authority of a member State other than the United Kingdom;

being a standard, code of practice or specification which provides, in use, levels of safety, suitability and fitness for purpose equivalent to those provided by the International Standard or the British Standard;

"Ro-ro cargo space" means a space in a ship:

(a) which is not subdivided in any way; and

(b) which extends either the entire length of the ship or a substantial part thereof; and

(c) into which vehicles, or goods loaded by means of a vehicle, are loaded; provided that such spaces are not used for bulk stowage of cargo;

"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;

"Closed ro/ro cargo space" is a ro/ro cargo space which is not an open ro/ro space and not a weather deck;

"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, main pantries, laundries, 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 workshops;

"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;

"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 the gross tonnage of a ship having alternative tonnages shall be taken to be the larger of these tonnages;

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

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

(2A) Any reference in these Regulations to any of the following-

(a) the Guidelines for Inert Gas Systems;

(b) a British Standard;

(c) the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk;

(d) the Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk;

shall include-

(i) 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; and

(ii) as respects a reference to a British Standard, a reference to a relevant standard of a member State other than the United Kingdom.

(3) (a) Subject to sub-paragraph (b) below these Regulations shall apply in relation to new ***Manx*** ships wherever they may be and to other ships while they are within the ***Isle of Man*** or the territorial waters thereof, except those the keels of which were laid or which were at a similar
stage of construction on or after 1st September 1984; which are :

(b) these Regulations shall not apply to :

(i) fishing vessels;

(ii) pleasure ***vessels*** which are not passenger ships and are of less than 13.7 metres in length;

(iii) the following non-***Manx*** ships :

(A) cargo ships of less than 500 tons;

(B) troopships;

(C) ships not propelled by mechanical means;

(D) pleasure ***vessels*** of 13.7 metres in length or more, which are not passenger ships;

(E) a ship by reason of her being within the ***Isle of Man*** or the territorial waters thereof if she would not have been therein but for stress of weather or any other circumstance that neither the master nor the owner nor the charterer (if any) could have prevented.

(c) for the purposes of this regulation "similar stage of construction" means a stage at which :

(i) construction identifiable with a particular ship began; and

(ii) assembly of that ship has commenced comprising at least 50 tonnes of one per cent of the estimated mass of all structural material whichever is the less.

(4) An approval given in pursuance of these Regulations shall be given in writing and shall specify the date on which it takes effect and the conditions (if any) on which it is given.

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 :

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 passenger ship's 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 ***Isle of Man*** 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 vopyages to or from isolated communities on the islands or coast of the ***Isle of Man*** and which do not proceed for a distance of more than 3 miles from land, subject to any conditions with the ***Department of Trade and Industry*** may impose.

Ships other than passenger ships

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

Class VII(A). Ships engaged in the whaling industry or employed as fish processing or canning factory ships, and ships engaged in the carriage of persons employed in the whaling, 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 II, VIII(T), IX, XI and XII) and other ships 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), XI and XII) and other ships engaged only on voyages which are not international voyages or which do not proceed to sea.

Class VIII(T). Tankers engaged only 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. Deleted by SI 1985/1194).

Class XI . Sailing ships (other than ships of Classes I to VI(A) inclusive) which proceed to sea

Class XII ***Pleasure vessels*** (other than ships of Classes I to VI(A) inclusive) of 45 ft in length or more.

(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;

(a) 1949 c. 43
(b) S.I. 1977/252, the relevant amending instrument is S.I. 1978/801

"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.

PART II - 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 a pump shall be capable of producing at least one jet of water from each of any two hydrants and hoses through nozzles which comply with the requirements of regulation 68(4)(b) of these Regulations, while simultaneously maintaining a pressure of at least 2.1 kilogrammes per square centimetre (30 pounds per square inch) 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 67 and 68 of these Regulations when all watertight doors in bulkheads constructed in accordance with regulation 53 of the Merchant Shipping (Passenger Ship Construction) Regulations 1980 [(a)] 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.

(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 with dual purpose 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 having dual-purpose 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 dual-purpose nozzles shall be provided for at least one quarter of the number of hoses required in parts of the ship other than machinery 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.

(10) 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.

Portable fire extinguishers in accommodation, cargo and service spaces

4. - (1) In every ship of Class I there shall be provided on each deck a sufficient number of portable fire extinguishers so that at least two shall be readily available for use in every accommodation and service space between watertight bulkheads constructed in compliance with regulation 53 of the Merchant Shipping (Passenger Ship Construction) Regulations 1980. In enclosed accommodation and service spaces above the bulkhead deck at least one such extinguisher shall be provided for use on each side of the ship in such spaces. 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.

(a) S.I. 1980/535

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

(3) 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; and

(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) 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 9 to these Regulations to protect every cargo space except special category spaces and spaces intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion.

(2) The ***Department of Trade and Industry*** may exempt any ship (other than a ship engaged in the carriage of dangerous goods) from the requirements of this regulation if ***it*** 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.

6. (1) 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 8 to these Regulations. The ***Department of Trade and Industry*** may permit the use of any other fixed fire-extinguishing system that 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.

(2) In every ship of Class I there shall be provided in each cargo space intended for the carriage of motor vehicles with fuel in their tanks for their own propulsion a fixed fire-extinguishing system complying with the requirements of Schedule 9 to these Regulations so as to protect every such cargo space.

(3) 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 8 to these Regulations. Due consideration shall be given to bilge pumping arrangements and drainage facilities.

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 7 to these Regulations;

(b) a fire extinguishing gas installation complying with the requirements of Schedule 9 to these Regulations;

(c) a halogenated hydrocarbon vapourising liquid fire extinguishing installation 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 regulation, 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 136 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 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 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.

(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; and

(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.

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 373 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; and

(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.

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.

Special requirements for machinery spaces

10. In every ship of Class I in any machinery space of Category A to which access is provided at a low level from an adjacent shaft tunnel there shall be provided in addition to any watertight door and on the side remote from that machinery space a light steel fire-screen door which shall be operable from each side.

Paint lockers etc

10A. In every ship of Class I, every paint locker and flammable liquid locker shall be protected by an approved fire-extinguishing system.

Fire patrol, detection and alarm systems

11. - (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 an automatic fire detection and fire allarm system complying with Schedule 12 to these Regulations.

(b) In every ship of Class I manual fire alarms shall be fitted throughout the passenger, crew and special category spaces which will enable the fire patrol to give an alarm immediately to the navigating bridge or fire control station. A manual alarm 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 in the opinion of the ***Department of Trade and Industry*** is not accessible to the fire patrol, and in each cargo space containing motor vehicles with fuel in their tanks for their own propulsion, an automatic fire detection and alarm system complying with 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 an automatic fire detection and fire alarm system complying with Schedule 12 to these Regulations.

(4) The ***Department of Trade and Industry*** may exempt any ship from the requirement in paragraph (2) of this regulation to provide an automatic fire detection and alarm system in any part of the ship which is not accessible to the fire patrol, if ***it*** 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 which is required by the Merchant Shipping (Passenger Ship Construction) Regulations 1980 to be provided with an automatic sprinkler and fire alarm and detection system, the arrangements shall comply with the requirements of Schedule 11 to these Regulations.

(6) Every ship of Class I which is required by the Merchant Shipping (Passenger Ship Construction) Regulations 1980 to be provided with an automatic fire alarm and detection system, the arrangements shall comply with the requirements of Schedule 12 to these Regulations.

(7) 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.

(8) 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.

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

Firemen's outfits

12. - (1) Every ship of Class I shall be provided with -

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

(b) 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. Every such outfit shall comply with the requirements of regulation 71 of these Regulations. Two of them shall include breathing apparatus of the air-hose type and the remainder shall include breathing apparatus of the self-contained type.

(2) 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

13. Every ship of Class I of 1,000 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 and 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

14. Regulations 3 to 13 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

15. Rules 3 to 13 inclusive of these Regulations shall apply to ships of Class II(A) 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

16. 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 hand 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 and a spray nozzle.

Portable fire extinguishers

17. 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 containing oil fired boilers or oil burning equipment

18.- (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.

(2) In addition to the requirements of paragraph (1) of this regulation 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.

Machinery spaces containing internal combustion type machinery

19. Every ship of Class II(A) of 15.24 metres in length or over but of less than 21.34 metres in length shall be provided in each space containing internal combustion type propulsion machinery with 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.

SHIPS OF CLASS III OF 21.34 METRES IN LENGTH OR OVER

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

20. (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 66 of these Regulations.

(3) Every such ship fitted with oil-fired boilers or internal combustion type propelling 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 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 67 and 68 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.

(7) In every such ship dual-purpose nozzles shall be provided for at least one quarter of the number of hoses required by paragraph (5) of this regulation in those parts of the ship other than machinery spaces.

Portable fire extinguishers

21. 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 provided for use in any galley.

Machinery spaces of Category A

22. (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 systems 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

23. 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 71 of these Regulations.

SHIPS OF CLASS III OF LESS THAN 21.34 METRES IN LENGTH

24. Regulations 16 to 19 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

25. (1) Regulations 20 and 21 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.

(2) In every ship of Class IV of 21.34 metres in length or over 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 136 litres capacity or carbon dioxide extinguishers each of a least 45 kilogrammes capacity. The extinguisher, or 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.

(3) In addition to the requirements of paragraph (2) of this regulation thee 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 quenching oil fires together with

a scoop for its distribution, or alternatively, an additional portable fire extinguisher suitable for extinguishing oil fires.

(4) In every ship of Class IV of 21.34 metres in length or over there shall be provided in any space containing internal combustion type propelling machinery :

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

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

SHIPS OF CLASS IV OF LESS THAN 21.34 METRES IN LENGTH

26. Regulations 16 to 19 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

27. - (1) Regulation 25 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 16 to 19 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

28. - (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 under 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 onto any part of the ship, and a spray nozzle.

SHIPS OF CLASSES VI AND VI(A)

FULLY-DECKED SHIPS

29.- (1) Regulation 25 shall apply to fully-decked ships of Classes VI and VI(A) of less than 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 16 to 19 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

30. Regulation 28 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.

SHIPS OTHER THAN PASSENGER SHIPS

SHIPS OF CLASS VII OF 500 TONS OR OVER

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

31. - (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.

(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 66 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 from any fire hydrant, hose and nozzle provided in the ship and shall comply with the requirements of regulation 66 of these Regulations.

(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 such ship of 1,000 tons or over the emergency fire pumps shall be capable of producing at least two jets of water from any of the hydrants and hoses through nozzles which shall comply with regulation 68(4)(b) of these Regulations while simultaneously maintaining a pressure of at least 2.1 kilogrammes per square centimetre (30 pounds per square inch) at any hydrant in the ship.

(c) In every such ship of 500 tons or over but under 1,000 tons, the emergency fire pump shall be capable of producing from any of the hydrants and hoses in the ship through a nozzle which shall comply with regulation 68(4)(b) of these Regulations, a jet of water having a throw of not less than 12 metres (40 feet).

(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 67 and 68 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 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.

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 which shall be of the dual purpose type, incorporating a shut-off..

(ii) 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.

(iii) 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

32. - (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 or service spaces. 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 :

(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

33. (1) In every ship of Class VII engaged in the carriage of dangerous goods there shall be provided a fixed fire extinguishing system complying with the requirements of Schedule 9 to these Regulations which shall be so arranged as to protect every cargo space.

(2) 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 fire extinguishing system complying with the requirements of Schedule 9 to these Regulations which shall be so arranged as to protect every cargo space.

(3) The ***Department of Trade and Industry*** may exempt any ship from the requirements of paragraph (2) of this regulation to provide a fixed fire-extinguishing installation in the cargo holds of the ship if ***it*** is satisfied that the holds therein are provided with steel hatch covers and effective means of closing all ventilators and other openings leading to the holds and the ship is employed solely in the carriage of ore, coal, grain, ***unseasoned timber or non-combustible cargoes or of cargoes which, in the opinion of the Department of Trade and Industry, constitute a low fire risk.***

(4) In every ship of Class VII engaged in the carriage of dangerous goods and in every other ship of Class VII of 2,000 tons or over there shall be provided in each open ro/ro cargo space having a deck over and each space which is a closed ro/ro cargo space not capable of being sealed, a fixed pressure water-spraying system complying with Schedule 3 to these Regulations. Due consideration shall be given to bilge pumping arrangements and drainage facilities.

Machinery spaces of Category A

34. - (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 pressure water spraying system complying with the requirements of Schedule 7 to these Regulations;

(b) a fire extinguishing gas installation complying with the requirements of Schedule 9 to these Regulations;

(c) A halogenated vapourising liquid fire extinguishing installation 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 room 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 136 litres capacity or carbon dioxide fire extinguishers 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 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 foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers of at least 16 kilogrammes

(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

35. - 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 373 kW for auxiliary purposes:

(a) foam fire extinguishers each of at least 45 litres capacity or carbon dioxide fire extinguishers each of at least 16 kilogrammes capacity sufficient in number to enable foam or carbon dioxide to be directed on to any part of the pressure lubrication system and on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing and any other areas of high fire risk: provided that such extinguishers shall not be required if equivalent protection is provided in such spaces by a fixed fire extinguishing system fitted in compliance with regulation 33(1) of these

Regulations; and

(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.

Fire-extinguishing appliances in other machinery spaces

36. Where a fire hazard exists in any machinery space for which no specific provisions for fire-extinguishing are made in regulations 34 and 35 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.

Special requirements for machinery spaces

37. In every ship of Class VII in any machinery space of Category A to which access is provided at a low level from an adjacent shaft tunnel there shall be provided in addition to any watertight door and on the side remote from that machinery space a light steel fire-screen door which shall be operable from each side.

Paint lockers etc

37A. In every ship of Class VII of 500 tons or over, every paint locker and flammable liquid locker shall be protected by an approved fire-extinguishing system.

Fire alarm and detection systems

38. - (1) This regulation applies to ships of Class VII of 500 tons or over.

(2) Every ship to which this regulation applies shall be provided with an automatic fire detection and alarm system complying with the requirements of Schedule 12 to these Regulations in any machinery space in which the installation of automatic and remote control systems and equipment has been approved in lieu of continuous manning of the space.

(3) In every ship to which this regulation applies there shall be fitted in each cargo space containing motor vehicles with fuel in their tanks for their own propulsion an automatic fire detection and alarm system complying with the requirements of Schedule 12 to these Regulations.

Firemen's outfits

39. - (1) Every ship of Class VII of 500 tons or over shall carry firemen's outfits which shall comply with the requirements of regulation 71 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.

(3) In every ship of 500 tons or over there shall be provided not less than four fireman's outfits complying with the requirements of regulation 71. Such outfits shall not be required to be provided in addition to those required by paragraph (1) of this regulation.

(4) Firemen's outfits shall be stored so as to be easily accessible and ready for use and where more than one fireman's outfit are carried they shall be stored in widely separated positions.

International shore connection

40. Every ship of Class VII of 1,000 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 and 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

41. (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 66 of these Regulations.

(c) In every such ship fitted with oil-fired boilers or internal combustion type propelling 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 millimetres 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 67 of these Regulations and at least three fire hoses and

nozzles which shall comply with regulation 68 of these Regulations.

(e) In every such ship fitted with oil-fired boilers or internal combustion type propelling machinery there shall be provided a dual-spray nozzle suitable for use with the fire hoses required by the preceding sub-paragraph.

(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 fixed fire-extinguishing installations required by regulation 34(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 quenching 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 one portable fire extinguisher suitable for extinguishing oil fires for each 74.6 kW or part thereof of such machinery, except that no more than seven such extinguishers shall be required in any one space and that alternatively there may be provided two such extinguishers together with either -

(a) one foam fire extinguisher of at least 45 litres capacity; or

(b) 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 71 of these Regulations and which shall contain a breathing apparatus of the air-hose type.

SHIPS OF CLASS VII(A)

42. (1) Regulations 31 to 40 inclusive of these Regulations shall apply to every ship of Class VII(A) of 500 tons or over as they apply to ships of Class VII of 500 tons or over.

(2) Every ship of Class VII(A) of less than 500 tons shall, if not subject to the Fishing Vessels (Safety Provisions) Rules 1975 [(a)] ; carry the fire appliances appropriate to its length which are required to be carried by vessels of that length which are subject to those Rules.

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

[(a)] S.I. 1975/330 to which there are amendments not subject to these Regulations

43. Regulations 31 and 32(1) and regulations 34 to 40 inclusive of these Regulations shall apply to every tanker of Class VII(T) of 500 tons or over.

44. Every tanker of Class VII(T) of 2,000 tons or over shall be provided with a fixed deck foam system complying with the requirements of regulation 52 ***[…]*** .

45. Every tanker of Class VII(T) of under 2,000 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.

46 (1) ***Subject to paragraph (1A) below*** 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 regulation 51 ***[…]*** **.**

(1A) A tanker referred to in paragraph (1) above need not be provided with an inert gas system complying with the requirements of regulation 51 if-

(a) being a chemical tanker carrying as cargo any substance mentioned in the said paragraph (1), it is provided with an inert gas system complying with the requirements of regulation 51A;

(b) being a chemical tanker carrying crude oil or petroleum products, it is provided with an inert gas system complying with the requirements of regulation 51B;

(c) being a gas carrier carrying as cargo a substance mentioned in the said paragraph (1), it is provided with cargo tank inerting arrangements equivalent to those specified in sub-paragraph (a) or (b) above;

(d) being a chemical tanker or gas carrier, it is carrying a flammable cargo other than crude oil or petroleum products.

In sub-paragraph (d) above, the reference to a flammable cargo other than crude oil or petroleum products includes (without prejudice to the generality of that reference) a reference to any of the cargoes listed in Chapters VI and VII of the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.

(2) 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 in accordance with the relevant operational requirements contained in the "Guidelines for Inert Gas Systems" and are to the satisfaction of the ***Department of Trade and Industry.***

47. Notwithstanding the provisions of regulation 46 every tanker of Class VII(T) operating with a tank cleaning procedure using crude oil washing, shall be :

(a) fitted with an inert gas system complying with regulation 51 of

these Regulations.

(b) provided with fixed tank washing machines only.

48. (1) Other fixed fire extinguishing systems may be provided in place of those required by the foregoing provisions of these Regulations, if each system is deemed to be equivalent to the said systems in the manner set out in paragraphs (2) and (3) below.

(2) An installation 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 :

(a) 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

(b) so designed as to minimize the risk of ignition from the generation of static electricity by the system itself.

(3) 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 :

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

(b) capable of combatting fires in ruptured tanks.

49. 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 34(1) of these Regulations and which shall be operated from a readily accessible position outside the pump room.

TANKERS OF CLASS VII(T) OF UNDER 500 TONS

50. Regulation 41 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 45 and 49 shall apply to such tankers as they apply to tankers of Class VII(T) of 500 tons or over.

Inert gas systems : Standard requirements

51 (1) Every fixed inert gas system fitted in accordance with ***regulation 46(1) or 47(a) of*** these Regulations shall comply with the requirements of paragraph (2) of this regulation except that inert gas systems fitted before 1st June 1981 shall not be required to comply with paragraph (2)(h), (i)(ii), (j)(ii), (j)(vii), (j)(ix), (k)(iii), (k)(iv), (m)(iii)(B), and (s)(viii).

(2) (a) (i) The inert gas system shall be designed, constructed and tested to the satisfaction of the ***Department of Trade and Industry***. It shall be so designed and operated as to render and maintain the atmosphere of the cargo tanks including the slop tanks non-flammable at all times, except where it is necessary for such

tanks to be gas free;

(ii) in the event that the inert gas system is unable to meet the operational requirement set out above and it has been assessed by the owner or master that it is impractical to effect a repair, then cargo discharge, deballasting and necessary tank cleaning shall only be resumed when the £emergency procedures" laid down in the "Guidelines for Inert Gas Systems" are complied with;

(b) The system shall be capable of -

(i) 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;

(ii) 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;

(iii) 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; and

(iv) 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;

(c) (i) the system shall be capable of delivering inert gas to the cargo tanks and slop tanks at a rate of least 125 per cent of the maximum rate of discharge capacity of the ship, expressed as a volume;

(ii) the oxygen content of the inert gas main shall not normally exceed 5 per cent by volume;

(d) 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 ***Department of Trade and Industry*** may approve other systems using inert gases other than flue gas, provided ***it*** is satisfied that an equivalent standard of safety is achieved. Systems using stored carbon dioxide shall not be permitted unless the ***Department of Trade and Industry*** is satisfied that the risk of ignition from generation of static electricity by the system itself is minimised.

(e) 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;

(f) (i) A flue gas scrubber shall be fitted which will effectively cool

the volume of gas specified in sub-paragraph (c) above 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.

(ii) filters or equivalent devices shall be fitted to minimise the amount of water carried over to the inert gas blowers.

(g) (i) 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 sub-paragraph (c) above. In a system provided with a gas generator, the ***Department of Trade and Industry*** may permit one blower if that system is capable of delivering the total volume of gas required by sub-paragraph (c) to the protected cargo tanks, on condition 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;

(ii) two fuel oil pumps shall be fitted to the inert gas generator. The ***Department of Trade and Industry*** may permit one fuel oil pump if 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;

(iii) the inert gas system shall be so designed that the maximum pressure which it can exert on any cargo tank will not exceed the test pressure of any cargo tank. Suitable shut-off arrangements shall be provided on the suction and discharge connections of each blower. Arrangements shall be provided to enable the functioning of the inert gas plant to be stabilised before commencing cargo discharge. If the blowers are to be used for gas freeing, their air inlets shall be provided with blanking arrangements.

(h) (i) 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;

(ii) 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;

(i) (i) A gas regulating valve shall be fitted in the inert gas supply main. Such valve shall be automatically controlled to close as required in sub-paragraph (s)(iii) and (s)(iv) below, and shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless means are provided for automatically controlling the speed of the inert gas blowers required in sub-
paragraph (g) above;

(ii) the valve referred to in sub-sub-paragraph (i) above shall be located at the forward bulkhead of the most forward gas-safe

space through which the inert gas supply main passes;

(j) (i) 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 sub-paragraph (i) above and the aftermost connection to any cargo tank or cargo pipeline;

(ii) the devices referred to in this paragraph shall be located in the cargo area on deck;

(iii) the water seal referred to in sub-sub-paragraph (i) above shall be capable of being supplied by two separate pumps, each of which shall be capable of maintaining an adequate supply at all times;

(iv) 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;

(v) 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;

(vi) A water loop or other arrangement approved by the ***Department of Trade and Industry*** shall also be fitted to all associated water supply and drain 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;

(vii) 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;

(viii) the second non-return device mentioned in sub-sub-paragraph (i) above 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-sub-paragraph (i) above. 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;

(ix) 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-sub-paragraph (viii) above, and the valve referred to in sub-paragraph (i) above to be vented in a safe manner when the

first of these valves is closed;

(k) (i) the inert gas main may be divided into two or more branches forward of the non-return devices required by sub-paragraph (j) above;

(ii) (A) 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.

(B) 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."

(iii) 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;

(iv) piping systems shall be so designed as to prevent the accumulation of cargo or water in the pipelines under all normal conditions;

(v) suitable arrangements shall be provided to enable the inert gas main to be connected to an external supply of inert gas;

(l) the arrangements for the venting of all vapours displaced from the cargo tanks during loading or ballasting shall comply with regulation 70(3) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1980 [(a)] 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;

(m) the arrangements for inerting, purging or gas freeing of empty tanks as required in sub-paragraph (b) above shall be approved by the ***Department of Trade and Industry*** 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) S.I. 1981/572 to which there is an amendment not relevant to these Regulations

(i) in 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 70(3) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1981. 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 ;

(ii) each gas outlet referred to in sub-sub-paragraph (i) above shall be fitted with suitable blanking arrangements;

(iii) (A) 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; and

(B) the valve separating the inert gas supply main from the cargo main and which is on the cargo main side shall be a non-return valve with a positive means of closure.

(n) (i) one or more pressure-vacuum breaking devices shall be provided to prevent the cargo tanks from being subject to -

(A) a positive pressure in excess of the test pressure of the cargo tank if the cargo were to be loaded at the maximum rated capacity and all other outlets were left shut; and

(B) 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 [(a)] or on individual cargo tanks;

(ii) the location and design of the devices referred to above shall be in accordance with regulation 70(3) of the Merchant Shipping
(Cargo Ship Construction and Survey) Regulations 1981;

(o) 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;

(p) (i) instrumentation shall be fitted for continuously indicating and permanently recording when the inert gas is being supplied -

(A) the pressure of the inert gas supply main forward of the non-return devices required by sub-paragraph (j)(i) above; and

(B) the oxygen content of the inert gas in the inert gas supply main on the discharge side of the gas blowers.

(ii) the devices referred to in sub-sub-paragraph (i) above 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;

(iii) in addition, meters shall be fitted :

(A) in the navigating bridge, to indicate at all times the pressure referred to in sub-sub-paragraph (i)(A) above and the pressure in the slop tanks of combination carriers, whenever those tanks are isolated from the inert gas supply main; and

(B) in the machinery control room or in the machinery space, to indicate the oxygen content referred to in sub-sub-paragraph (i)(b) above;

(q) 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;

(r) suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in sub-paragraphs (p) and (q) above;

(s) (i) audible and visual alarms shall be provided to indicate:

(A) low water pressure or low water flow rate to the flue gas scrubber referred to in sub-paragraph (f)(i) above;

(B) high water level in the flue gas scrubber referred to in sub-paragraph (f)(i) above;

(C) high gas temperature referred to in sub-paragraph (o) above;

(D) failure of any of the inert gas blowers referred to in sub-paragraph (g) above;

(E) oxygen content referred to in sub-sub-paragraph (p)(i)(B) above in excess of 8 per cent by volume;

(F) failure of the power supply to the automatic control system for the gas regulating valve and to the indicating devices referred to in sub-paragraphs (i) and (p)(i) respectively above;

(G) low water level in the water seal referred to in sub-paragraph (j)(i) above;

(H) gas pressure as referred to in sub-paragraph (p)(i)(A) above less than 100 millimetres water gauge; 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

(I) high gas pressure referred to in sub-paragraph (p)(i)(A) above;

(ii) in systems fitted with gas generators, audible and visual alarms shall be provided in accordance with sub-sub-paragraphs (i)(A), (i)(C) and (i)(E) to (i)(I) above and additional alarms to indicate:

(A) insufficient fuel oil supply;

(B) failure of the power supply to the generator;

(C) failure of the power supply to the automatic control system for the generator;

(iii) automatic shut down of the inert gas blowers and gas regulating valve shall be arranged to operate on system design limits being reached in respect of sub-sub-paragraph (i)(A), (B)
and (C) above;

(iv) automatic shut down of the gas regulating valve shall be arranged so as take account of failure of the inert gas blowers referred to in sub-paragraph (g) above;

(v) in relation to sub-sub-paragraph (i)(E) above, 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 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 (j)(viii) above shall be closed;

(vi) the alarms required in sub-sub-paragraphs (i)(E), (i)(F) and (i)(H) above 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;

(vii) in relation to the water seal referred to in sub-sub-paragraph (s)(i)(G) above, arrangements shall be made to the satisfaction of the ***Department of Trade and Industry*** for the maintenance of an adequate reserve of water at all times for 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;

(viii) an audible alarm system, independent of that required in sub-sub-paragraph (i)(H), or automatic shut down of cargo pumps, shall be provided to operate on the system designed limit of low pressure in the inert gas main being reached;

(t) a detailed instruction manual shall be provided on board by the owner which shall contain the operational safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. In addition 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";

(u) all tankers fitted with a fixed gas system in accordance with this regulation shall be provided with a closed ullage system.

(Regulations 51A and 51B following are inserted by S.I. 1993/3162).

Inert gas systems: Alternative requirements for chemical tankers

51A.- (1) (a) Every inert gas system fitted in accordance with regulation 46(1A)(a) of these Regulations shall be designed, constructed and tested to the satisfaction of the ***Department of Trade and Industry*** and shall comply with the following requirements of this regulation.

(b) In this regulation a reference to a cargo tank includes a reference to a slop tank containing cargo residues.

(2) The system shall be capable of:

(a) inerting empty cargo 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 all parts of each cargo tank designated to carry flammable products requiring protection by an inert gas system, with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times 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 of flammable vapour, so that subsequent gas-freeing operations will at no time create a flammable atmosphere within the tanks.

(3) (a) The system shall be capable of delivering inert gas to the cargo tanks at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship expressed as a volume. The ***Department of Trade and Industry*** may accept an inert gas system having a lower delivery capacity provided that the maximum rate of discharge of cargoes from cargo tanks being protected by the system is restricted to 80 per cent of the inert gas capacity.

(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 at any required rate of flow.

(4) (a) Suitable fuel in sufficient quantity shall be provided for the inert gas generators.

(b) The inert gas generators shall be located outside the cargo tank area as defined in the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Spaces containing inert gas generators shall have no direct access to accommodation, service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces, they shall be located in a compartment reserved solely for their use. Such a compartment shall be separated by a gastight steel bulkhead or deck from accommodation, service and control station spaces. Adequate positive-pressure-type mechanical ventilation shall be provided for such a compartment. Access to such compartments located aft shall be only from an open

deck outside the cargo tank area. Access shall be located on the end bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 25 per cent of the length of the ship but not less than 5 metres from the end of the superstructure or deckhouse facing the cargo area. In the case of such a compartment being located in the forecastle, access shall be through the deckhead forward of the cargo area.

(c) Inert gas piping systems shall not pass through accommodation, service and control station spaces.

(5) (a) Means shall be provided which will effectively cool the volume of gas specified by paragraph (3) of this regulation 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 main.

(6) (a) Two air blowers shall be fitted to each inert gas generator, which together shall be capable of delivering to the cargo tanks required to be protected by the system at least the volume of gas required by paragraph (3) of this regulation. The ***Department of Trade and Industry*** may permit only one blower if it is capable of delivering to the protected cargo tanks the total volume of gas required by paragraph (3) of this regulation, provided that sufficient spares for the air blower and its prime mover are carried on board to enable any failure of the air blower and its prime mover to be rectified.

(b) 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 that tank.

(c) Where more than one inert gas generator is provided, suitable shut-off arrangements shall be provided on the discharge outlet of each generator plant.

(d) Arrangements shall be made to vent the inert gas to the atmosphere in case the inert gas produced is sub-standard, eg during starting-up or in case of equipment failure.

(e) Where inert gas generators are served by positive displacement blowers, a pressure relief device shall be provided to prevent excess pressure being developed on the discharge of the blower.

(7) Two fuel oil pumps shall be fitted to each inert gas generator. The ***Department of Trade and Industry*** 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.

(8) A gas-regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required by paragraph (17)(b) and (c) of this

regulation. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless other means are provided to control automatically the inert gas flow rate.

(9) (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 flammable vapour to the inert gas generator and to any gas-safe space under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph (8) of this regulation and the first connection to any cargo tank or cargo pipeline. The ***Department of Trade and Industry*** may permit an alternative arrangement or device providing a measure of safety equivalent to that of a water seal.

(b) The devices referred to in sub-paragraph (a) of this paragraph shall be located in the cargo tank 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 water seal and its associated provisions shall be such that it will prevent backflow of flammable vapours and will ensure the proper functioning of the water seal under operating conditions.

(e) Provision shall be made to ensure that any water seal is protected against freezing, in such a way that the integrity of the water seal is not impaired by overheating.

(f) A water loop or other approved arrangement shall also be fitted to all associated water supply and drain piping and to 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) Any water seal or equivalent device and all loop arrangements shall be capable of preventing the return of flammable vapours to an inert gas generator at a pressure equal to the test pressure of the cargo tanks.

(h) The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted between the water seal or the equivalent device required by sub-paragraph (a) of this paragraph and the first connection from the inert gas main to a cargo tank. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided between the non-return valve and the first connection to the cargo tanks to isolate the water seal or equivalent device.

(i) As an additional safeguard against the possible leakage of flammable 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 (8) of this regulation to be vented in a safe manner when the first of these valves is closed.

(10) (a) The inert gas main may be divided into two or more branches between the non-return devices required by paragraph (9) of this regulation and

the cargo tanks.

(b) Inert gas supply mains shall be fitted with branch piping leading to each cargo tank designated for the carriage of flammable products required to be inerted by this regulation. Each cargo tank containing or loading products not required to be inerted shall be separated from the inert gas main by:

(i) removing spool pieces, valves or other pipe sections, and blanking the pipe ends; or

(ii) an arrangement of two spectacle flanges in series with provision for detecting leakage into the pipe between the two spectacle flanges.

(c) Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the tanks are isolated from the inert gas mains.

(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.

(11) Unless the arrangements for venting of all vapours displaced from the cargo tanks during loading and ballasting comply with the requirements of the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk for controlled venting, such arrangements shall comply with regulation 12 of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984 [(a)] and shall consist either of one or more mast risers or of a number of high velocity vents.

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(12) The arrangements for inerting, purging or gas-freeing of empty tanks as required by paragraph (2) of this regulation shall be to the satisfaction of the ***Department of Trade and Industry*** and shall be such that the accumulation of hydrocarbon vapours in pockets formed by the internal structural members in a tank is minimised and that:

(a) on individual cargo tanks the gas outlet pipe, if fitted, shall be positioned as far as practicable from the inert gas/air inlet and in accordance with regulation 12(5)(c) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1984. The inlet of such outlet pipes may be located either at deck level or at not more than 1 metre above the bottom of the tank;

(a) S.I. 1984/1217; relevant applying or amending instruments are S.I. 1985/661, 1986/1067

(b) the cross-sectional area of such 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. When in accordance with paragraph (3) of this regulation the ***Department of Trade and Industry*** permits a system designed to supply only one tank or two tanks simultaneously, the outlet pipes shall be sized such that an exit velocity in the outlet pipes of 20 metres per second can be maintained;

(c) each gas outlet referred to in sub-paragraph (b) of this paragraph shall be fitted with suitable blanking arrangements.

(13) Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the system, whenever it is operating.

(14) (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 mains between the non-return devices required by paragraph (9)(a) of this regulation and the cargo tanks; and

(ii) the oxygen content of the inert gas in the inert gas supply main.

(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

(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.

(15) Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

(16) Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs (14) and (15) of this regulation.

(17) (a) Audible and visual alarms shall be provided to indicate:

(i) low water pressure or low water flow rate to the cooling and scrubbing arrangements referred to in paragraph (5)(a) of this regulation;

(ii) low fuel supply;

(iii) high gas temperature referred to in paragraph (13) of this regulation;

(iv) failure of the power supply to the inert gas generators;

(v) oxygen content in excess of 8 per cent by volume referred to in paragraph (14)(a)(ii) of this regulation;

(vi) failure of the power supply to the indicating devices referred to in paragraph (14)(a) of this regulation and to the automatic control systems for the gas-regulating valve referred to in paragraph (8) of this regulation and the inert gas generator;

(vii) low water level in the water seal referred to in paragraph (9) of

this regulation;

(viii) gas pressure less than 100 millimetres water gauge referred to in paragraph (14)(a) of this regulation;

(ix) high gas pressure referred to in paragraph (14)(a)(i) of this regulation.

(b) Automatic shutdown of the gas-regulating valve and of the fuel oil supply to the inert gas generator shall be arranged on predetermined limits being reached in respect of sub-paragraph (a)(i) and (iii) of this paragraph.

(c) Automatic shutdown of the gas-regulating valve shall be arranged in respect of sub-paragraph (a)(iv) of this paragraph.

(d) In respect of sub-paragraph (a)(v) of this paragraph, when the oxygen content of the inert gas exceeds 8 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the inert gas improves, all operations in those tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the tanks. The deck isolation valve referred to in paragraph (9)(h) of this regulation shall be closed, and the sub-standard gas shall be vented to atmosphere.

(e) The alarms required by sub-paragraph (a)(v), (vi) and (viii) of this paragraph shall be fitted in the machinery space and cargo control room, where provided, but in each case in such a position that they are immediately received by responsible members of the crew. All other alarms required by this paragraph shall be audible to responsible members of the crew either as individual alarms or as a group alarm.

(f) In respect of sub-paragraph (a)(vii) of this paragraph, the ***Department of Trade and Industry*** 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.

(g) An audible alarm system, independent of that required by sub-paragraph (a)(viii) of this paragraph, or automatic shutdown of cargo pumps shall be provided to operate on pre-determined limits of low pressure in the inert gas mains being reached.

(18) Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.

Inert gas systems: Alternative requirements for chemical tankers carrying crude oil or petroleum products

51B. (1) (a) Every inert gas system fitted in accordance with regulation 46(1A)(b)

of these Regulations shall be designed, constructed and tested to the satisfaction of the ***Department of Trade and Industry*** and shall comply with the following requirements of this regulation.

(b) In this regulation a reference to a cargo tank includes a reference to a slop tank containing oil residues.

(2) The system shall be capable of:

(a) inerting empty cargo 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 all parts of each cargo tank designated to carry flammable products requiring protection by an inert gas system with an oxygen content not exceeding 8 per cent by volume and at a positive pressure at all times 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 of flammable vapour, 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 at a rate of at least 125 per cent of the maximum rate of discharge capacity of the ship expressed as a volume. The ***Department of Trade and Industry*** may accept an inert gas system having a lower delivery capacity provided that the maximum rate of discharge of cargoes from cargo tanks being protected by the system is restricted to 80 per cent of the inert gas capacity.

(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 at any required rate of flow.

(4) (a) Suitable fuel in sufficient quantity shall be provided for the inert gas generators.

(b) The inert gas generators shall be located outside the cargo tank area as defined in the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk. Spaces containing inert gas generators shall have no direct access to accommodation, service or control station spaces, but may be located in machinery spaces. If they are not located in machinery spaces they shall be located in a compartment reserved solely for their use. Such a compartment shall be separated by a gastight steel bulkhead or deck from accommodation, service and control station spaces. Adequate positive-pressure-type mechanical ventilation shall be provided for such a compartment. Access to such compartments located aft shall be only from an open deck outside the cargo tank area. Access shall be located on the end bulkhead not facing the cargo area or on the outboard side of the superstructure or deckhouse at a distance of at least 25 per cent of the length of the ship but not less than 5 metres from the end of the

superstructure or deckhouse facing the cargo area. In the case of such a compartment being located in the forecastle, access shall be through the deckhead forward of the cargo area.

(c) Inert gas piping systems shall not pass through accommodation, service and control station spaces.

(5) (a) Means shall be provided which will effectively cool the volume of gas specified by paragraph (3) of this regulation 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 main.

(6) (a) Two air blowers shall be fitted to each inert gas generator, which together shall be capable of delivering to the cargo tanks required to be protected by the system at least the volume of gas required by paragraph (3) of this regulation. The ***Department of Trade and Industry*** may permit only one blower if it is capable of delivering to the protected cargo tanks the total volume of gas required by paragraph (3) of this regulation, provided that sufficient spares for the air blower and its prime mover are carried on board to enable any failure of the air blower and its prime mover to be rectified.

(b) 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 that tank.

(c) Where more than one inert gas generator is provided, suitable shut-off arrangements shall be provided on the discharge outlet of each generator plant.

(d) Arrangements shall be made to vent the inert gas to the atmosphere in case the inert gas produced is sub-standard, eg during starting-up or in case of equipment failure.

(e) Where inert gas generators are served by positive displacement blowers, a pressure relief device shall be provided to prevent excess pressure being developed on the discharge side of the blower.

(7) Two fuel oil pumps shall be fitted to each inert gas generator. The ***Department of Trade and Industry*** 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.

(8) A gas-regulating valve shall be fitted in the inert gas supply main. This valve shall be automatically controlled to close as required by paragraph (17)(b) and (c) of this regulation. It shall also be capable of automatically regulating the flow of inert gas to the cargo tanks unless other means are provided to control automatically the inert gas flow rate.

(9) (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 flammable vapour to the inert gas generator and to any gas-safe

space under all normal conditions of trim, list and motion of the ship. They shall be located between the automatic valve required by paragraph (8) of this regulation and the first connection to any cargo tank or cargo pipeline. The ***Department of Trade and Industry*** may permit an alternative arrangement or device providing a measure of safety equivalent to that of a water seal.

(b) The devices referred to in sub-paragraph (a) of this paragraph shall be located in the cargo tank 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 water seal and its associated provisions shall be such that it will prevent backflow of flammable vapours and will ensure the proper functioning of the water seal under operating conditions.

(e) Provision shall be made to ensure that any water seal is protected against freezing, in such a way that the integrity of the water seal is not impaired by overheating.

(f) A water loop or other approved arrangement shall also be fitted to all associated water supply and drain piping and to 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) Any water seal or equivalent device and all loop arrangements shall be capable of preventing the return of flammable vapours to an inert gas generator at a pressure equal to the test pressure of the cargo tanks.

(h) The second device shall be a non-return valve or equivalent capable of preventing the return of vapours or liquids or both and fitted between the water seal or the equivalent device required by sub-paragraph (a) of this paragraph and the first connection from the inert gas main to a cargo tank. It shall be provided with positive means of closure. As an alternative to positive means of closure, an additional valve having such means of closure may be provided between the non-return valve and the first connection to the cargo tanks to isolate the water seal or equivalent device.

(i) As an additional safeguard against the possible leakage of flammable 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 (8) of this regulation to be vented in a safe manner when the first of these valves is closed.

(10) (a) The inert gas main may be divided into two or more branches between the non-return devices required by paragraph (9) of this regulation and the cargo tanks.

(b) Inert gas supply mains shall be fitted with branch piping leading to each cargo tank designated for the carriage of flammable products required to be inerted by this regulation. Each cargo tank containing or loading products not required to be inerted shall be separated from the

inert gas main by:

(i) removing spool pieces, valves or other pipe sections, and blanking the pipe ends; or

(ii) an arrangement of two spectacle flanges in series with provision for detecting leakage into the pipe between the two spectacle flanges.

(c) Means shall be provided to protect cargo tanks against the effect of overpressure or vacuum caused by thermal variations when the cargo tanks are isolated from the inert gas mains.

(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.

(11) Unless the arrangements for venting of all vapours displaced from the cargo tanks during loading and ballasting comply with the requirements of the I.M.C.O. Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk for controlled venting, such arrangements shall comply with regulation 70(3) of the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1981 **(A)** and shall consist either of one or more mast risers or a number of high velocity vents. The inert gas supply mains shall not be used for such venting.

(12) (a) The arrangements for inerting, purging or gas-freeing of empty tanks as required by paragraph (2) of this regulation shall be to the satisfaction of the ***Department of Trade and Industry*** and shall be such that the accumulation of flammable vapours in pockets formed by the internal structural members in a tank is minimised.

(b) When in accordance with paragraph (3) of this regulation the ***Department of Trade and Industry*** permits a system designed to supply only one tank or two tanks simultaneously, the outlet pipes shall be sized such that an exit velocity in the outlet pipes of 20 metres per second can be maintained.

(13) Means shall be provided for continuously indicating the temperature and pressure of the inert gas at the discharge side of the system, whenever it is operating.

(14) (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 mains between the non -return devices required by paragraph (9)(a) of this regulation and the cargo tanks; and

(ii) the oxygen content of the inert gas in the inert gas supply main.

(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

(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.

(15) Portable instruments for measuring oxygen and flammable vapour concentration shall be provided. In addition, suitable arrangements shall be made on each cargo tank such that the condition of the tank atmosphere can be determined using these portable instruments.

(16) Suitable means shall be provided for the zero and span calibration of both fixed and portable gas concentration measurement instruments, referred to in paragraphs (14) and (15) of this regulation.

(17) (a) Audible and visual alarms shall be provided to indicate:

(i) low water pressure or low water flow rate to the cooling and scrubbing arrangement referred to in paragraph (5)(a) of this regulation;

(ii) low fuel supply;

(iii) high gas temperature referred to in paragraph (13) of this regulation;

(iv) failure of the power supply to the inert gas generators;

(v) oxygen content in excess of 8 per cent by volume referred to in paragraph (14)(a)(ii) of this regulation;

(vi) failure of the power supply to the indicating devices referred to in paragraph (14)(a) of this regulation and to the automatic control systems for the gas-regulating valve referred to in paragraph (8) of this regulation and the inert gas generator;

(vii) low water level in the water seal referred to in sub-paragraph (9)(a) of this regulation;

(viii) gas pressure less than 100 millimetres water gauge referred to in paragraph (14)(a) of this regulation;

(ix) high gas pressure referred to in paragraph (14)(a)(i) of this regulation.

(b) Automatic shutdown of the gas-regulating valve and of the fuel supply to the inert gas generator shall be arranged on pre-determined limits being reached in respect of sub-paragraph (a)(i) and (iii) of this paragraph.

(c) Automatic shutdown of the gas-regulating valve shall be arranged in respect of sub-paragraph (a)(iv) of this paragraph.

(d) In respect of sub-paragraph (a)(v) of this paragraph, when the oxygen content of the inert gas exceeds 8 per cent by volume, immediate action shall be taken to improve the gas quality. Unless the quality of the inert gas improves, all operations in those tanks to which inert gas is being supplied shall be suspended so as to avoid air being drawn into the tanks. The deck isolation valve referred to in paragraph (9)(h) of this regulation shall be closed, and the sub-standard gas shall be

vented to atmosphere.

(e) The alarms required by sub-paragraph (a)(v), (vi) and (viii) of this paragraph shall be fitted in the machinery space and cargo control room, where provided, but in each case in such a position that they are immediately received by responsible members of the crew. All other alarms required by this paragraph shall be audible to responsible members of the crew either as individual alarms or as a group alarm.

(f) In respect of sub-paragraph (a)(vii) of this paragraph, the ***Department of Trade and Industry*** 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.

(g) An audible alarm system, independent of that required by sub-paragraph (a)(viii) of this paragraph, or automatic shutdown of cargo pumps shall be provided to operate on predetermined limits of low pressure in the inert gas mains being reached.

(18) Detailed instruction manuals shall be provided on board, covering the operations, safety and maintenance requirements and occupational health hazards relevant to the inert gas system and its application to the cargo tank system. The manuals shall include guidance on procedures to be followed in the event of a fault or failure of the inert gas system.

Deck foam installations

52. Every fixed deck foam system fitted in accordance with these Regulations shall comply with the following :

(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 -

(i) 0.6 litre per minute per square metre of cargo deck area, where cargo deck area means the maximum breadth of the ship times the total longitudinal extent of the cargo tank spaces;

(ii) 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 Regulation 51 of these Regulations or 30 minutes of foam generation in ships not fitted with an inert gasinstallation. The foam expansion ratio (that is, the ratio of the volume of foam produced to the volume of the mixture of water and foam-making concentrate supplied) 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 (i) and (ii) of paragraph (3) of this regulation 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 (i) or (ii) of paragraph (3) of this regulation.

(6) (i) The number and position of monitors shall be such as to comply with paragraph (1) of this regulation. 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.

(ii) 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 deck. Alternatively 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 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 regulation, 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.

SHIPS OF CLASS VIII

SHIPS OF 500 TONS OR OVER

53. Regulations 31 to 40 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

54. Regulation 41 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

55. (1) This regulation applies to ships of Class VIII of under 150 tons.

(2) (a) Regulation 41(2) of these Regulations shall apply to every such 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 41(2)(b) 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 a hand 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 propelling 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**
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 propelling machinery shall, if it is mainly or wholly constructed of wood and is decked by 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 CLASS VIII(A),IX AND IX(A)

56. - (1) Regulations 53 to 55 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 ***Department of Trade and Industry*** 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.

TANKERS OF CLASS VIII(T)

TANKERS OF 500 TONS OR OVER

57. (1) Regulation 53 of these Regulations shall apply to tankers of Class VIII(T) of 500 tons or over as they apply to ships of Class VIII of 500 tons or over.

(2) Regulations 43 to 49 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

58. Regulation 54 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 45 and 49 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

59. Regulation 55 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 45 of these Regulations.

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

60. - (1) Subject to paragraph (1A) of this Regulation, Regulations 57 to 59 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).

(1A) Every tanker of 2,000 tons or over of any of the Classes specified in paragraph (1) of this regulation fitted with a deck foam system in compliance with regulation 52 shall be provided with not less than four firemen's outfits complying with the requirements of regulation 71. Such outfits shall not be required to be provided in addition to those required by paragraph (1) of regulation 39.

(2) The ***Department of Trade and Industry*** 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.

61 ***(Deleted by SI 1985/1194).***

SHIPS OF CLASS XI

62. (1) Regulations 53 to 55 inclusive of these Regulations shall apply to ships of Class XI as they apply to ships of Class VIII.

(2) The ***Department of Trade and Industry*** may exempt any ship of Class XI from any of the requirements of these Regulations.

SHIPS OF CLASS XII

63. - (1) Regulations 53 and 54 of 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 66 of these Regulations;

(c) in every such ship fitted with oil-fired boilers or internal combustion type propelling machinery, if the pump required by the preceeding 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 preceeding 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 67 of these Regulations and at least two fire hoses.

(e) In every such ship fitted with oil fired boilers or internal combustion type propelling machinery there shall be provided a spray nozzle suitable for use with the fire hoses required by the preceding sub-paragraph.

(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 a hand 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 ***Department of Trade and Industry*** may exempt any ship of Class XII from any of the requirements of these Regulations.

PART IV - GENERAL

Additional requirements for ships carrying explosives

64. (1) In any ship to which these Regulations apply, other than a ship carrying more than 12 passengers, which carries explosives of such nature or in such quantity as are permitted to be carried in a passenger ship by the ***Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1991*** [(a)] steam shall not be used for fire smoothering purpose in any compartment containing explosives. In any suich compartment containing explosives and in every adjacent cargo compartment there shall be provided a fire detection system complying with the requirements of Schedule 12 to these Regulations.

(2) For the purposes of this regulation, “compartment” means all spaces contained between two adjacent permanent bulkheads and includes the lower hold and all cargo spaces above it. The whole of any shelter deck space not sub-divided by steel bulkheads the opening in which can be closed by steel closing plates shall, for the purpose of this regulation, be considered as a single space. Where steel bulkheads with openings closed by steel closing plates are fitted, the enclosed spaces in the shelter deck shall be considered as part of the compartment below.

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

65. - (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.

(c) Carbon dioxide extinguishers of total capacity of not less than 16 kilogrammes, which shall be so equipped as to enable it to be applied to the engine area of any helicopter using the deck.

(2) The arrangement of water service pipes, hydrants, hoses and nozzles 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) All such nozzles provided in accordance with paragraph (2) shall be of dual purpose type.

(4) 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

66. (1) (a) 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 67 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) Regulations 1980.

(b) 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 67 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:

(i) 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

(ii) $d=1+\sqrt{\frac{L(B+D)}{2500}}$ 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;

or $d=1 + 0.066 \sqrt{L(B+D)}$ to the nearest 0.25 where L, B, and D are measured in metres;

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.

(2) 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.

(3) 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.

(4) (a) 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 when more fire pumps operated by power than are required these Regulations are provided in any ship, the ***Department of Trade and Industry*** may permit the capacity of any such additional fire pumps to be less than 80 per cent.

(b) Every fire pump required by these Regulations which is operated by power 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 the Regulations as appropriate to the class and tonnage of the ship, while maintaining the pressure required by regulation 67(2) of these Regulations.

(5) 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.

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

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

Firemain, water service pipes and hydrants

67. (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 sufficient only for the discharge of 140 cubic metres per hour.

(2) When the fire pumps required by these Regulations are 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 68 of these Regulations, the following minimum pressure shall be capable of being maintained at any hydrant :

(a) in any passenger ship -

(i) of 4,000 tons and upwards :

45 pounds per square inch; or 3.2 kilogrammes per square centimetre;

(ii) of 1,000 tons and upwards but under 4,000 tons :

40 pounds per square inch; or 2.8 kilogrammes per square centimetre;

(iii) of under 1,000 tons :

30 pounds per square inch; or 2.1 kilogrammes per square centimetre;

(b) in any ship other than a passenger ship -

(i) of 6,000 tons and upwards :

40 pounds per square inch; or 2.8 kilogrammes per square centimetre;

(ii) of 1,000 tons and upwards but under 6,000 tons -

37 pounds per square inch; or 2.6 kilogrammes per square centimetre;

(iii) of under 1,000 tons

30 pounds per square inch; or 2.1 kilogrammes per square centimetre;

(3) (a) Where any ship is required by these Regulations to provide 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.

(b) Where any ship is required by these Regulations to provide 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. The pipes and fire hydrants shall be so placed that the fire hoses may be easily coupled to them. 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. 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.

(c) Valves of the screw lift type or cocks shall be fitted in such position on the pipes that any of the fire hoses may be removed while the fire pumps are at work.

(d) The water pipes shall not be made of cast iron, and if made of iron or steel shall be galvanised.

(e) Where wash deck lines are not self-draining suitable drain cocks shall be fitted to avoid damage by frost.

Fire hoses, nozzles, etc

68.- (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 shall not exceed 27 metres in length. ***Every such hose forming part of the ship's equipment before 1st February 1992 shall be made of closely woven flax, canvas or other suitable material, and every other such hose shall be made of non-perishable material. Every such hose shall be provided with couplings, branch-pipes, other necessary fittings, and with plain nozzles or dual-purpose nozzles as required by these Regulations.*** In tankers all hoses shall be provided with dual-purpose nozzles.

(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

Department of Trade and Industry may permit smaller diameter hoses may be permitted in small ships.

(3) Except in partially decked ships of Classes V, VI and VI(A) and in ships of Class XII, fire hoses provided in compliance with Regulations shall not be used for any purpose other than for extinguishing or testing with 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 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 66(4)(a) 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 dual-purpose nozzle provided in compliance with these Regulations shall be capable of producing a water-spray suitable for extinguishing oil fires and a plain water jet and shall incorporate a shut-off facility.

Fire extinguishers

69. - (1) Non-portable foam, carbon dioxide and dry powder fire extinguishers provided in compliance with these Regulations shall be constructed in accordance with 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 be of not less fire extinguishing capability than a 9 litre fluid fire extinguisher.

(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) or bromotrifluoromethane (B.T.M.) 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 constructed in accordance with British Standard BS 5423:1977 or with any British Standard replacing the same which is considered by the Secretary of State to be relevant from time to time and is specified in a Merchant Shipping Notice

(6) 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.

(7) Portable 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, at 21°C and atmospheric pressure, 1 kilogramme pf liquid BCF may be taken to occupy 0.14 cubic metre and 1 kilogramme of liquid BTM 0.16 cubic metre.

(8) Where portable halogenated 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.

(9) 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 ***Department of Trade and Industry.***

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

(11) For the purposes of these Regualtions 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 troprical climate.

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

(13) A spare charge shall be provided for every portable 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

70. - (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 a fire.

Firemen's outfits

71. - (1) Every fireman's outfit carried in compliance with these Regulations shall consist of -

(a) a breathing apparatus complying with the requirements specified in Schedule 5 to these Regulations;

(b) a portable self-contained electric battery-operated safety lamp capable of functioning efficiently for a period of at least three hours;

(c) a fireman's axe;

(d) 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;

(e) boots and gloves of rubber or other electrically non-conducting material; and

(f) a 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, 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

72. - (1) In every ship to which these Regulations apply, there shall be provided means for stopping ventilating fans serving machinery, accommodation and cargo spaces. For machinery, cargo spaces and accommodation spaces there shall be provided means for closing all skylights, doorways, ventilators, annular spaces around funnels and other openings to such spaces. In passenger ships carrying more than 36 passengers means shall be provided 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) In every ship to which these Regulations apply 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 carrying more than 36 passengers such controls together with the controls required in paragraph (1) of this paragraph shall be situated at one control position or grouped in as few positions as possible, as the ***Department of Trade and Industry*** may permit.

(3) 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 traversed by any shaft or pipe tunnel, a valve or valves may be fitted on the pipe line or lines outside the tunnel or tunnels to enable control to be exercised in the event of fire.

Fire control plans

73. - (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 fire resisting bulkheads, the sections of the ship which are enclosed by fire retarding bulkheads, 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 regulation 72 of these Regulations.

(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 the information referred to in paragraph (1) of this regulation where it is applicable to the ship.

(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 fire control plans 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

74. Fire appliances carried in any ship to which these Regulations apply 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.

Fixed fire extinguishing installation not required by these Regulations

75. In every ship where a fixed fire extinguishing installation not required by these Regulations is provided, such an installation shall be to the satisfaction of the ***Department of Trade and Industry.***

Equivalents and exemptions

76. (1) Where these Regulations require 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 ***Department of Trade and Industry may allow*** 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 ***it*** is satisfied by trial thereof or otherwise that such other fitting, material, appliance or apparatus, or type thereof, or provision, is at least as effective as that required by these Regulations.

(1A) For the purposes of these Regulations, the results of a verification or test shall be accepted if the verification or test is carried out-

(a) in accordance with these Regulations or with a standard, code of practice, specification or technical description of a member State other than the United Kingdom offering equivalent levels of safety, suitability and fitness for purpose; and

(b) by a body or laboratory of a member State other than the United Kingdom offering suitable and satisfactory guarantees of technical and professional competence and independence.

(2) The ***Department of Trade and Industry*** 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 ***it*** may so specify and may, subject to giving reasonable notice, alter or cancel any such exemption.

(3) An exemption or equivalent arrangement permitted by these Regulations is only valid if —

(a) it is in writing;
(b) it specifies the date on which it takes effect; and
(c) any conditions stated in it are complied with.

Penalties

77.- If a ship to which these Regulations apply, proceeds or attempts to proceed to sea without complying with the requirements of these Regulations, the owner or 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 ***information***, to imprisonment for a term not exceeding two years and a fine.

Powers to detain

78.- 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 as if for the words "this Act" wherever they appear, there were substituted "the Merchant Shipping Acts 1894 to 1979 or any Regulations made thereunder."

SCHEDULE 1

Regulations 13 and 40

INTERNATIONAL SHORE CONNECTION

(1). The international shore connection shall be in accordance with the following specification -

Details of flange	
Outside diameter:	178 millimetres (7 inches)
Inner diameter:	64 millimetres (2.5 inches)
Bolt circle diameter:	132 millimetres (5.25 inches)
Holes:	4 holes of 19 millimetres (0.75 inches) in diameter equidistantly placed, slotted to the flange periphery
Flange thickness:	14.5 millimetres minimum
Bolts:	4 each of 16 millimetres diameter; 50 millimetres (2 inches) in length with washers
Flange surface flat face	
Material:	any suited to 10.5 kilogrammes per square centimetre (150 pounds per square inch) service.
Gasket:	any suited to 10.5 kilogrammes per square centimetre (150 pounds per square inch) service.

(2) The connection shall be constructed of material suitable for 10.5 kilogrammes per square centimetre (150 pounds per square inch) service. 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 69(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: 1976.

(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 this 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 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 136 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 136 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 5423:1977.

SCHEDULE 3

Regulation 69(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: 1977.

SCHEDULE 4

Regulation 69(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: 1976.

(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 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 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 5423:1977.

SCHEDULE 5

Regulation 71(1)(a)

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 such 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 Trade 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 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 snap-hook;

(iii) means for protecting the eyes and face of the wearer against smoke; and

(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(3)(b), 7(2)(b) and (3)(b), 32(2)(b), 34(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 shall be suitable for delivering foam solution (which is the mixture of water and foam concentrate) at the rate of at least 200 litres per minute.

(3) The foam expansion ratio (i.e. the ratio of the volume of foam produced to the volume of foam solution) shall not exceed 12 to 1.

SCHEDULE 7

Regulations 7(1)(a), and 34(1)(a)

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 another purpose except that the ***Department of Trade and Industry*** 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 -

	Application rate	
Protected area	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 1980 or the Merchant Shipping (Cargo Ship Construction and Survey) Regulations 1980, 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 pump.

(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 8

Regulations 6(1) and (3) and 33(4)

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 forming the boundaries of staircases etc. 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 of 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 Class 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 7 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 kilogrammes per square centimetre 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 9

Regulations 5(1), 6(2), 7(1)(b), 33(1) and (2), and 34(1) (b)

FIXED GAS FIRE-EXTINGUISHING SYSTEMS

(1) 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.

(2) In every such system provided for the injection of gas into any compartment for fire extinguishing purposes, the pipes for conveying the gas 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. Suitable provisions shall be made to prevent inadvertent admission of the medium to any compartment. 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.

(3) The piping shall be arranged as to provide effective distribution of the fire extinguishing gas.

(4) (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. Where the volume of free air contained in air receivers in any machinery space of Category A is such that, if released in such space in the event of fire, such a release of air within the space would seriously affect the efficiency of the fixed fire installation, an additional quantity of carbon dioxide shall be provided.

(d) When carbon dioxide is used as the extinguishing medium for machinery spaces and cargo spaces or pump rooms the quiantity of gas shall not be requiired to be more than the maximum required for the largest compartment so protected.

(e) For the purpose of this paragraph the volume of carbon dioxide shall be calculated at 0.56 cubic metre to the kilogramme.

(f) (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 sub-paragraph (c) of this paragraph 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.

(g) Carbon dioxide cylinder storage rooms shall be situated at a safe and readily accesible position and shall be effectively ventilated. Access to such rooms shall normally be from the open deck and shall be independent of the protected space and accommodation spaces. Access doors shall be gas-tight and bulkheads and decks which separate such rooms from enclosed spaces shall be gas-tight and adequately insulated.

(h) Means shall be provided for giving audible warning to persons within the space when carbon dioxide is about to be released into any working space. The warning shall operate foe a suitable period before the gas is released.

(5) Where gas other than carbon dioxide 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 elenents and any solid combustible elements have been reduced to a permissible minimum. Any installation using such gas shall afford equivalent protection to that provided by a fixed carbon dioxide system.

(6) When a system producing inert gas is used to provide extinguishing gas in a fixed fire extinguishing installation 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.

(7) No part of the control, storage or generating arrangement of any fixed fire extinguishing installation shall be situated forward of the collision bulkhead in any passenger ship.

(8) Operating instructions in clear and permanent lettering shall be affixed to every fixed fire extinguishing installation or in a position adjacent thereto.

SCHEDULE 10

Regulations 7(1)(c) and 34(1)(c)

FIXED HALOGENATED HYDROCARBON FIRE EXTINGUISHING INSTALLATION FOR MACHINERY SPACES AND CARGO PUMP ROOMS

(1) A halogenated hydrocarbon medium which, in the opinion of the ***Department of Trade and Industry***, either by itself or under expected conditions of use gives off gases in such quantities as to endanger persons shall not be used in a fixed halogenated hydrocarbon fire extinguishing system.

(2) Means of control shall be provided and shall be clearly marked to indicate the compartment into which the medium can be admitted. Suitable provisions shall be made to prevent inadvertant admission of the medium into any compartment.

(3) 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.

(4) The system shall be arranged for manual initiation of release of the medium and such means shall be provided outside the space protected. Automatic initiation od release shall not be permitted except as allowed for by paragraph (14)(e) of this Schedule and in respect of local automatically operated units referred to in paragraph (15) and (16) pf this Schedule.

(5) the means of manual initiation of release shall be simple to operate and shall be so located in as few positions as possible where they will be easily accessible and not readily cut off from use by the outbreak of fire within the protected space or spaces.

(6) When the quantity of medium provided is required for use in more than one space, the arrangements for its storage and release shall be such that compliance with paragraphs (7) or (8) of this Schedule in each such space is obtained. The quantity available need only be sufficient for the largest compartment.

(7) (a) Where the medium is bromotrifluoromethane, (CB_rF_3), (BTM), the quantity required shall be such that when it is released into the space the vapour concentration in air shall not be less than 4.25 per cent of the gross volume or more than 7 per cent of the nett volume including casing of that space. The volume of the medium shall be calculated at 0.16 cubic metre to the kilogramme.

(b) When the medium is bromochlorodifluoromethane, (CB_rClF_2), (BCF), the quantity required shall be such that when it is released into the space, the vapour concentration in air shall not be less than 4.25 per cent of the gross volume or more than 5.5 per cent of the nett volume including casings of that space. The volume of the medium shall be calculated at 0.14 cubic metre to the kilogramme.

(c) Where the volume of free air contained in air receivers in any machinery space is such that, if released in such a space in the event of fire, it seriously affects the efficiency of the installation, the

Department of Trade and Industry shall require the provision of an additional quantity of the medium.

(8) The arrangements shall be such that the liquid phase of the minimum quantity of medium required by paragraph (7) when applied to the space concerned can be discharged into that space within 20 seconds or less.

(9) Means shall be provided for giving audible warning to persons within the space when the medium is about to be released into any working space. The warning shall operate foe a suitable period before the gas is released.

(10) Means shall be provided for automatically stopping all ventilation fans serving the protected space before the medium is released.

(11) Means shall be provided for the crew to safely check the quantity of medium in the containers and the pressure therein.

(12) 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 miximum ambient temperatures expected in service.

(13) Except as permitted in paragraph (14), the medium shall be stored in suitable containers outside the protected space in a storage room situated at a safe and readily accessible position which shall be effectively ventilated. Any access to such storage rooms shall be from the open deck and shall be gas tight and open outwards and bulkheads and eecks which separate rooms from other enclosed spaces shall be gas tight and adequately insulated.

(14) Where the medium is BTM the storage containers may be permitted within a protected space provided that the arrangements comply with the following requirements :

(a) The containers shall be distributed throughout the space having regard to the requirements of paragraph (3) of this Schedule.

(b) Duplicate sources of power shall be provided for releasing the medium and shall be immediately available. At least one of the sources of power shall be located outside the protected space. Pneumatic or hydraulic circuits essential for the release of medium from the containers shall be duplicated.

(c) 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.

(d) 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 material.

(e) Each container shall be fitted with an automatic over-pressure release 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.

(d) The arrangements of the containers and the powere circuits 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 (7) 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 ***Department of Trade and Industry*** may permit only one or two containers if ***it*** is satisfied with the storage and release arrangements.

(g) Not more than two discharge nozzles shall be fitted to any container.

(h) The containers shall be monitored for decrease or loss in pressure due to leakage and discharge. Visual and audible alarms in the protected space and at the control station shall be provided to indicate this.

(15) Local automatically operated units containing BTM or 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 -

(a) The space in which such additional local protection is provided should be on one working level and on the same level as the access.

(b) The escape arrangements shall be such that escape from anywhere in such protected spaces can be effected in not more than ten seconds.

(c) The operation of any unit shall be indicated by visual and audible alarms outside each access into the space and at the control station.

(d) 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.

(e) The total quantity of medium provided in such units within a protected space shall be such that the maximum vapour concentrations specified in paragraph (7) pf this Schedule is not exceeded when all such units operate within that space.

(f) The time to discharge the liquid phase of the medium in any local automatically operated unit shall not exceed ten seconds.

(g) 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.

(h) Every such unit shall comply with paragraphs (3), (11) and (12) of this Schedule.

(16) 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 :

(a) 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.

(b) Every such unit shall comply with paragraphs (3), (except that uniform distribution of the medium may not be required), (11), (12), and (15)(c), (d), (f) and (g) of this Schedule.

(17) Suitable spares shall be provided to ensure the effective operation of such systems.

(18) Operating instructions in clear and permanent lettering shall be affixed either to the means of control or in a position adjacent thereto. Such instruction shall take account of the safety of personnel.

SCHEDULE 11

Regulation 11(5)

AUTOMATIC SPRINKLER, FIRE ALARM AND FIRE DETECTION SYSTEM

(1) *Type and charging of system*

The automatic sprinkler, and fire alarm and detection system shall be of the wet type with overhead sprinklers and shall at all times be fully charged. Small sections of the dry type may be permitted as necessary.

(2) 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.

(3) *Details of the system*

The system shall comply with the following arrangements :

(a) *Pressure tank*

(i) A pressure tank of adequate strength and construction having regard to the charge of water specified in this sub-paragraph shall be provided and 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 sub-paragraph (e)(v) of this paragraph. The total capacity of the tank shall not be less than twice the standing charge of fresh water required for the automatic operation of the system. The arrangements shall provide for maintaining such air pressure in the tank 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 due to a head of water measured from the bottom of the tank to the highest sprinkler in the system.

(ii) 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 connections. Means shall be provided to prevent the inadvertent admission of sea water into the tank.

(b) *Air supply*

The pressure tank shall be connected to an air supply capable of maintaining in the tank the pressure required by sub-paragraph (a) of this paragraph.

(c) Pipes

(i) The pipes forming part of the system shall be made of steel or other suitable material and shall be be of adequate strength having regard to the pressure to which they may be subjected, and shall be properly jointed and supported.

(ii) Means shall be provided which will enable the standing fresh water charge in the pressure tank to be replenished and the pipes to be flushed with fresh water after the use of salt water in the system.

(iii) Any pipes which may be affected by frost shall be insulated so as to prevent the water therein from freezing.

(d) *External connections*

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.

(e) *Pump*

(i) An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinkler heads. 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.

(ii) 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.

(iii) 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 sub-paragraph (a) of this paragraph.

(iv) The arrangements shall be such as will prevent the pump from passing sea water into the pressure tank.

(v) 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 sub-paragraph (f)(v) of this paragraph.

(f) *Sprinkler heads*

(i) Sprinkler heads shall be grouped into separate sections, each of which shall contain not more than 200 sprinkler heads. A section of sprinkler heads shall not serve more than two decks and shall not be situated in more than one water-tight compartment. Provided that, in any ship, a section of sprinkler heads may serve more than two decks or be in more than one main vertical zone, if the ***Department of Trade and Industry*** is satisfied that the protection of the ship against fire is not thereby reduced.

(ii) Each section of sprinkler heads shall be controlled by one control valve and no other valves shall be provided for controlling any of the sprinklers in that section. The control valves shall be readily accessible and their location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the control valves by any person not authorised to do so by the master of the ship.

(iii) A pressure gauge shall be provided at each control valve and at a central station to indicate the pressure of water available throughout the system.

(iv) The sprinkler shall be resistant to corrosion by marine atmospheres and shall come into operation at a temperature of not less than 68°C and not more than 79°C, except in drying rooms and similar hot spaces the operating temperature may be increased by not more than 30°C above the maximum deck head temperature.

(v) 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 sprinkler. Alternative distribution arrangements or sprinklers providing other amounts of water may be permitted providing the arrangements are no less effective.

(vi) Sprinkler heads 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.

(vii) At least six space sprinkler heads shall be provided for each section.

(g) *Automatic alarm*

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 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. Such alarm system shall be constructed so as to indicate if any fault occurs in the system.

(h) *Power supply*

Not less than two sources of power supply for the sprinkler pump, air compressor and automatic alarm and detection system shall be provided. 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 (2) of this Schedule, be so situated that a fire in any protected space will not affect the air supply to the machinery.

(i) *Provision for testing*

(i) 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 control valve for that section.

(ii) Means shall be provided for testing the automatic operation of the pump on reduction of pressure in the system.

(iii) Means shall be provided at one of the indicating positions referred to in sub-paragraph (g) of this paragraph which will enable the alarm and the indicators for each section of the sprinkler system to be tested.

(4) A plan shall be displayed at each indicating unit sahowing the spaces covered and the location of the zone in respect of each section.

(5) Suitable instructions for testing and maintenance shall be provided.

SCHEDULE 12

Regulations 11(1)(a), (2), (3) and (6), 38(2) and (3), and 64(1)

AUTOMATIC FIRE ALARM AND FIRE DETECTION SYSTEMS

General

Every automatic fire alarm and fire detection system shall comply with the following requirements :

(1) The system shall be capable of immediate operation at all times and no action by the crew shall be necessary to set it in operation.

(2) The system shall be based on the self-monitoring principle and incluide facilities for periodic testing.

(3) The system shall not be used for any purpose other than fire detection.

(4) The system shall be operated by an abnormal air temperature, by an abnormal vconcentration of smoke or by other factors indicative of incipient fire in any one of the spaces to be protected. Systems which are sensitive to air temperature shall not operate at less than 57°C and shall operate at a temperature of not greater than 74°C when the temperature increase to those levels is not more that 1°C per minute. The permissible temperature of operation may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar places of normally high ambient temperature. Systems which are sensitive to smoke concentration shall operate on the reduction of the intensity of a transmitted light beam, scatter of a light beam or changes in electric current in an ionising chamber by an amount determined by the ***Department of Trade and Industry.*** Other methods of operation may be accepted if the ***Department of Trade and Industry*** is satisfied that such methods are equally effective.

(5) The detectors may be arranged to operate the alarm by the opening or closing of contacts or by other appropriate methods and shall be of a re-settable type such that after response to an alarm condition they can be restored to normal surveillance without the renewal of any component. They shall be fitted in an overhead position and shall be suitably protected against impact and physical damage. They shall be suitable for use in a marine environment. They shall be placed in an open position clear of beams and other objects likely to obstruct the flow of hot gases or smoke to the sensing element. Detectors operated by the closing of contacts shall be of the sealed contact type.

(6) Each section of detectors shall include means for giving a visual and audible alarm automatically at one or more indicating units whenever any detector comes into operation. Such units shall give an indication of any fire and its location in any space served by the system. A list or plan shall be displayed adjacent to each indicating unit showing the spaces covered by each section and the location of that section in the ship.

(7) Provision shall be made for testing the correct operation of the detectors and the indicating unit by supplying means for applying hot air or smoke at detector positions.

(8) At least one space detector of each type for each section shall be provided.

(9) There shall be not less than two sources of power supply for the electrical equipment used in the operation of the 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 a change over switch situated in the control station for the system. The electric wiring shall be so arranged as to avoid galleys, machinery spaces and other enclosed spaces having a high fire risk except in so far as it is necessary to provide for fire detection and alarm in such spaces or to reach the appropriate switchboard.

(10) Suitable instructions for testing and maintenance shall be available.

Accommodation and service spaces

(11) In accommodation and service spaces, the system shall comply with the following additional requirements :-

(a) Detectors shall be grouped into separate sections. Each section shall contain not more than 100 detectors and shall cover not more than 50 rooms. No section covering such spaces shall cover machinery spaces of Category A or cargo spaces.

(b) In passenger ships, each section shall not serve spaces on both the port and starboard sides of the ship nor more than one deck and neither shall it be situated in more than one main vertical zone, except that the ***Department of Trade and Industry*** if satisfied that the protection of the ship against fire will not thereby be reduced, may permit such a section of detectors may be permitted to serve both port and starboard sides of the ship and more than one deck.

(c) At least one detector shall be installed in each space where detection facilities are required and in accommodation and service spaces there shall be not less than one detector for approximately each 37 square metres of deck area. In large spaces the detectors shall be arranged in a regular pattern so that no detector is more than 9 metres from another detector or more than 4.5 metres from a bulkhead. However the surface area and distances referred to in this sub-paragraph may be varied if the ***Department of Trade and Industry*** deems that safety is not lessened taking into account the type of detectors used, the conditions of ventilation and other factors prevailing in the space in which the detectors are installed.

(d) The indicating units required in paragraph (6) shall be centralised on the navigating bridge or in the main fire control station of passenger ships 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.

Machinery spaces

(12) In machinery spaces the system shall comply with the following additional requirements :

(a) The system shall be designed and the detectors so positioned as to detect rapidly the onset of fire in any part of these spaces and under

any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures.

(b) No section covering a machinery spaces of Category A shall cover any acvcommodation, service or cargo spaces.

(c) Except in spaces of restricted height and where their use is specially appropriate, systems using only thermal detectors shall not be permitted.

(d) The indicating units required in paragraph (6) shall be located in sufficient places to ensure that any alarm is received by a responsible engineer officer. When the bridge is unmanned in port the alarm shall sound in a place where a responsible person will be on duty. In addition, when a machinery space of Category A is to be left periodically unattended, such indicating units shall also be located on the navigating bridge.

Cargo spaces

(13) 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 ***Department of Trade and Industry*** taking into account the conditions of ventilation and other factors prevailing in the space in which the detectors are installed;

(c) The indicating units required by paragraph (6) shall be located on the navigating bridge or in the main fire control station, if fitted, which shall be so manned or equipped to ensure that the alarm from the system is immediately received by a responsible member of the crew.

EXPLANATORY NOTE

(This note is not part of the Regulations)

These Regulations introduce requirements in respect of ***Manx*** ships, and other ships which are registered in a country to which the Safety of Life at Sea Convention 1974 applies when they are with the ***Isle of Man*** or the territorial waters thereof. The requirements give effect to the 1974 Convention (Cmnd 7874), and to the Protocol of 1978 relating to the International Convention for the Safety of Life at Sea (Cmnd 7346).

In addition to the inclusion of the general requirements of the 1965 Rules and the 1974 Amendment Rules these Regulations require-

(1) water for fire fighting to be immediately available on passenger ships (regulation 3(4)(b)) and on cargo ships having machinery spaces which are periodically unmanned (regulation 66(3));

(2) additional fire appliances in machinery spaces (regulations 3, 7, 8 and 34 to 37);

(3) particular fire fighting equipment and provision to be made for special category spaces, ro-ro cargo spaces and spaces intended for motor vehicles (Regulations 6 and 33(4));

(4) halogenated hydrocarbon fixed fire extinguishing equipment to be provided in machinery spaces (regulations 7 and 34);

(5) deck foam systems to be provided in specified tankers (regulation 52) and, in the case of specified ***Manx*** tankers, with inert gas systems (regulation 51);

(6) fire protection systems to be provided in special category spaces and machinery spaces operated from a control room or which are periodically unmanned (regulations 12 and 38);

(7) fire fighting equipment to be provided in ships with helicopter landing facilities (regulation 65).

Existing ships are now required to comply with the requirements set out in the Merchant Shipping (Fire Protection) (Ships built before 25th May 1980) Regulations 1985.

The British Standard is obtainable from the British Standards Institution, 2 Park Street, London W1A 2BS.
The IMCO Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk is obtainable from the ***IMO, 4 Albert Embankment, London, SE1 7SR.***

Amendments:
The definition of a Pleasure Vessel in these Regulations has been replaced by the definition in SD396/03. This was done by SD396/03 which replaces the definition of a Pleasure Vessel in the Schedule to SD247/93 which has the effect of replacing the definition of a Pleasure Vessel in S.I. 1993 No. 1072 as they are applied to the Island. The effect of replacing the definition of a Pleasure Vessel in SI 1993 No. 1072 is to replace the definition in these Regulations as they are applied to the Isle of Man.

The Merchant Shipping (Survey and Certification) Regulations 2018 (SD2018/0088) amend regulation 76 of these Regulations.