

RESOLUTION A.122(V) adopted on 25 October 1967
AMENDMENTS TO THE INTERNATIONAL
FOR THE SAFETY OF LIFE AT SEA, 1960

INTER-GOVERNMENTAL MARITIME
CONSULTATIVE ORGANIZATION



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AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1960

RESOLUTION A.122(V)
adopted on 25 October 1967

THE ASSEMBLY,

RECOGNIZING the need to improve safety of life at sea,

NOTING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization, concerning the functions of the Assembly with regard to regulations relating to maritime safety,

NOTING FURTHER that Article IX of the International Convention for the Safety of Life at Sea, 1960 in paragraphs (b), (d), (e), (g) and (h), provides for procedures of amendment involving participation of the Organization,

HAVING CONSIDERED certain amendments to the International Convention for the Safety of Life at Sea, 1960, forming the subject of a recommendation adopted by the Maritime Safety Committee at its fourteenth and fifteenth sessions, and directed towards improvement of fire safety measures for ships, of arrangements for life-saving appliances on certain tanker and cargo vessels and of VHF radiotelephony in areas of high traffic density, and also directed toward improvement

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of requirements in relation to exemption of novel types of craft and in relation to repair, modification and outfitting ships,

ADOPTS the following six amendments to the Regulations annexed to the International Convention for the Safety of Life at Sea, 1960, each of which amendments shall be communicated for acceptance to Contracting Governments in accordance with Article IX(d) of the Convention:

- (a) The addition of a new paragraph (b) to Regulation 4 of Chapter I and the designation of existing Regulation 4 as paragraph (a). The text of this amendment is at Annex I to this Resolution;
- (b) The addition of a new sub-paragraph (iii) to paragraph (a) of Regulation 1 of Chapter II, the text of which is at Annex II to this Resolution;
- (c) The addition of a Part H of Chapter II (Regulations 92-123 inclusive), entitled "Fire Protection, Fire Detection and Fire Extinction in Passenger Ships", the text of which is at Annex III to this Resolution;
- (d) The replacement of sub-paragraph (ii) of paragraph (a) of Regulation 64 of Chapter II by new sub-paragraphs (ii) and (iii), and the replacement of Regulations 64(j) and 70 of Chapter II and Regulations 25 and 26(a)(iv) of Chapter III by new Regulations. The text of this amendment appears at Annex IV to this Resolution;

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- (e) The replacement of paragraphs (a) and (c) of Regulation 35 of Chapter III by new paragraphs. The text of this amendment is at Annex V to this Resolution;
- (f) The addition of a new paragraph (g) to Regulation 2 of Chapter IV, new Regulation 7 bis and new Regulation 15 bis of Chapter IV and new Regulation 18 of Chapter V, the text of which is at Annex VI to this Resolution,

EXPRESSED the view, that after Part H of Chapter II comes into force, passenger ships carrying not more than 36 passengers shall continue to comply with the appropriate provisions of Parts D, E and F of Chapter II of the International Convention for the Safety of Life at Sea, 1960,

REQUESTS the Secretary-General of the Organization, in conformity with Article IX(b)(i), to communicate, for purposes of acceptance, certified copies of this Resolution and its Annexes, to all Contracting Governments of the International Convention for the Safety of Life at Sea, 1960, together with copies to all Members of the Organization, and

INVITES all Governments concerned to accept each of the amendments at the earliest possible date.

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ANNEX I

Regulation 4(b)

The Administration may exempt any ship which embodies features of a novel kind from any of the provisions of Chapters II, III and IV of these Regulations the application of which might seriously impede research into the development of such features and their incorporation in ships engaged on international voyages. Any such ship shall, however, comply with safety requirements which, in the opinion of that Administration, are adequate for the service for which it is intended and are such as to ensure the overall safety of the ship and which are acceptable to the Governments of the States to be visited by the ship. The Administration which allows any such exemption shall communicate to the Organization particulars of same and the reasons therefor, which the Organization shall circulate to the Contracting Governments for their information.

ANNEX II

Regulation 1(a)(iii)

A ship which undergoes repairs, alterations, modifications and outfitting related thereto shall continue to comply with at least the requirements previously applicable to the ship. An existing ship in such a case shall not, as a rule, comply to a lesser extent with the requirements for a new ship than it did before. Repairs, alterations and modifications of a major character and outfitting related thereto should meet the requirements for a new ship in so far as the Administration deems reasonable and practicable.

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ANNEX III

PART H - FIRE PROTECTION, FIRE DETECTION AND
FIRE EXTINCTION IN PASSENGER SHIPS

Regulation 92

Application

The Regulations in this Part of the Chapter shall apply to passenger ships, carrying more than 36 passengers, the keels of which are laid on or after the date on which such Regulations come into force, and replace in relation to such ships the provisions of Regulation 31 of Part C and the provisions of Parts D, E, F and G of this Chapter applicable to passenger ships the keels of which are laid on or after 26 May 1965.

Regulation 93

General

The purpose of this Part is to require the fullest practicable degree of fire protection, fire detection and fire extinction in passenger ships. The basic principles underlying the Regulations in this Part are:

- (a) division of ship into main vertical zones by thermal and structural boundaries;
- (b) separation of accommodation spaces from the remainder of the ship by thermal and structural boundaries;

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- (c) restricted use of combustible materials;
- (d) detection of any fire in the zone of origin;
- (e) containment and extinction of any fire in the space of origin;
- (f) protection of means of escape or access for fire-fighting;
- (g) ready availability of fire extinguishing appliances.

Regulation 94

Definitions

Whenever the phrases defined below occur throughout this Part of this Chapter, they shall be interpreted in accordance with the following definitions:

- (a) Incombustible Material means a material which neither burns nor gives off inflammable vapours in sufficient quantity to ignite at a pilot flame or other ignition source when heated to approximately 750°C (1,382°F). Any other material is a "Combustible Material".
- (b) A Standard Fire Test is one in which specimens of the relevant bulkheads or decks are exposed in a test furnace to temperatures corresponding approximately to the standard time-temperature curve. The specimen shall have an exposed surface of not less than 4.65 square metres (50 square feet) and height (or length of deck) of 2.44 metres (8 feet) resembling as closely as possible the intended construction and including where appropriate at least one joint. The standard time-temperature curve is defined by a smooth curve drawn through the following points:

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at the end of the first	5	minutes	-	538°C	(1,000°F)
" " " " " "	10	"	-	704°C	(1,300°F)
" " " " " "	30	"	-	843°C	(1,550°F)
" " " " " "	60	"	-	927°C	(1,700°F)

(c) "A", "B" and "C" Class Divisions

(i) "A" Class Divisions are those divisions formed by bulkheads and decks which comply with the following:

- (1) they shall be constructed of steel or other equivalent material;
- (2) they shall be suitably stiffened;
- (3) they shall be so constructed as to be capable of preventing the passage of smoke and flame to the end of the one-hour standard fire test;
- (4) they shall be insulated with approved incombustible materials such that the average temperature of the unexposed side will not rise more than 139°C (250°F) above the original temperature, nor will the temperature, at any one point, including any joint, rise more than 180°C (325°F) above the original temperature, within the time listed below:

Class A-60	60 minutes
Class A-30	30 minutes
Class A-15	15 minutes
Class A-0	0 minutes

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- (5) the Administration may require a test of a prototype bulkhead or deck to ensure that it meets the above requirements for integrity and temperature rise.
- (ii) "B" Class Divisions are those divisions formed by bulkheads, decks, ceilings or linings which comply with the following:
- (1) they shall be so constructed as to be capable of preventing the passage of flame to the end of the first one half-hour of the standard fire test;
 - (2) they shall have an insulation value such that the average temperature of the unexposed side will not rise more than 139°C (250°F) above the original temperature, nor will the temperature at any one point, including any joint, rise more than 225°C (405°F) above the original temperature, within the time listed below:

Class B-15	15 minutes
Class B-0	0 minutes
 - (3) they shall be constructed of approved incombustible materials and all materials entering into the construction and erection of "B" Class divisions shall be incombustible.
 - (4) the Administration may require a test of a prototype division to ensure that it meets the above requirements for integrity and temperature rise.

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- (iii) "C" Class Divisions shall be constructed of approved incombustible materials. They need meet no requirements relative to the passage of smoke and flame nor the limiting of temperature rise.
- (d) Continuous "B" Class Ceilings or Linings are those "B" Class ceilings or linings which terminate only at an "A" or "B" Class division.
- (e) Steel or Other Equivalent Material. Where the words "steel or other equivalent material" occur, "equivalent material" means any material which, by itself or due to insulation provided, has structural and integrity properties equivalent to steel at the end of the applicable fire exposure to the standard fire test (e.g. aluminium alloy with appropriate insulation).
- (f) Low flame spread means that the surface thus described will adequately restrict the spread of flame, this being determined to the satisfaction of the Administration by an established test procedure.
- (g) Main Vertical Zones are those sections into which the hull, superstructure, and deckhouses are divided by "A" Class divisions, the mean length of which on any one deck does not in general exceed 40 metres (131 feet).
- (h) Accommodation Spaces are those used for public spaces, corridors, lavatories, cabins, offices, crew quarters, barber shops, isolated pantries and lockers and similar spaces.
- (i) Public Spaces are those portions of the accommodation which are used for halls, dining rooms, lounges and similar permanently enclosed spaces.

- (j) Service Spaces are those used for galleys, main pantries, stores (except isolated pantries and lockers), mail and specie rooms, workshops other than those forming part of machinery spaces, and similar spaces and trunks to such spaces.
- (k) Cargo Spaces are all spaces used for cargo (including cargo oil tanks) and trunks to such spaces.
- (l) Special Category Spaces are those enclosed spaces 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.
- (m) 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, stabilizing, ventilation and air conditioning machinery, and similar spaces; and trunks to such spaces.
- (n) Machinery Spaces of Category A are all spaces which contain internal combustion type machinery used either
 - (1) for main propulsion, or
 - (2) for other purposes where such machinery has in the aggregate a total power of not less than 500 b.h.p.,or which contain any oil-fired boiler or oil fuel unit; and trunks to such spaces.

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- (r) Oil Fuel Unit means the equipment used for the preparation of oil fuel for delivery to an oil fired boiler, or equipment used for the preparation for delivery of heated oil to an internal combustion engine, and includes any oil pressure pumps, filters and heaters dealing with oil at a pressure more than 1.8 kilogrammes per square centimetre (25 pounds per square inch) gauge.
- (p) Control Stations are those spaces in which ship's radio or main navigating equipment or the emergency source of power is located or where the fire recording or fire control equipment is centralized.
- (q) Rooms containing Furniture and Furnishings of Restricted Fire Risk. For the purpose of Regulation 98 of this Chapter, rooms containing furniture and furnishings of restricted fire risk (whether cabins, public spaces, offices or other types of accommodation) are those in which:
- (i) all case furniture such as desks, wardrobes, dressing tables, bureaux, dressers, is constructed entirely of approved incombustible materials, except that a combustible veneer not exceeding 2.0 millimetres (one twelfth inch) may be used on the working surface of such articles;
 - (ii) all free standing furniture such as chairs, sofas, tables, is constructed with frames of incombustible materials;
 - (iii) all draperies, curtains and other suspended textile materials have, to the satisfaction of the Administration, qualities of resistance

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to the propagation of flame not inferior to those of wool weighing 0.8 kilogrammes per square metre (24 ounces per square yard);

- (iv) all floor coverings have, to the satisfaction of the Administration, qualities of resistance to the propagation of flame not inferior to those of an equivalent woollen material used for the same purpose; and
- (v) all exposed surfaces of bulkheads, linings and ceilings have low flame spread characteristics.

Regulation 95

Structure

The hull, superstructure, structural bulkheads, decks and deckhouses shall be constructed of steel or other equivalent material. For the purpose of applying the definition of steel or other equivalent material as given in Regulation 94(e) of this Chapter, the "applicable fire exposure" shall be according to the integrity and insulation standards given in the tables of Regulation 98 of this Chapter. As an example, where divisions such as decks or sides and ends of deckhouses are permitted to have B-0 fire integrity, the "applicable fire exposure" shall be one half-hour.

Provided that in cases where any part of the structure is of aluminium alloy, the following requirements shall apply:

- (a) The insulation of aluminium alloy components of "A" or "B" Class divisions, except structure which in the opinion of the Administration is non-load-bearing, shall be such that the temperature of the structural core does not rise more than 200°C (360°F) above the ambient temperature at any time during the applicable fire exposure to the standard fire test.

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- (b) Special attention shall be given to the insulation of aluminium alloy components of columns, stanchions and other structural members required to support lifeboat and liferaft stowage, launching and embarkation areas, and "A" and "B" Class divisions to ensure:
- (i) that for such members supporting lifeboat and liferaft areas and "A" Class divisions the temperature rise limitation specified in paragraph (a) of this Regulation shall apply at the end of one hour; and
- (ii) that for such members required to support "B" Class divisions, the temperature rise limitation specified in paragraph (a) of this Regulation shall apply at the end of one half-hour.
- (c) Crowns and casings of machinery spaces of Category A shall be of steel construction adequately insulated and openings therein, if any, shall be suitably arranged and protected to prevent the spread of fire.

Regulation 96

Main Vertical Zones and Horizontal Zones

- (a) The hull, superstructure and deckhouses shall be subdivided into main vertical zones by "A" Class divisions. Steps and recesses shall be kept to a minimum, but where they are necessary, they shall also be "A" Class divisions. These divisions shall have insulation values in accordance with the applicable tables in Regulation 98 of this Chapter.
- (b) As far as practicable, the bulkheads forming the boundaries of the main vertical zones above the bulkhead deck shall be in line with watertight subdivision bulkheads situated immediately below the bulkhead deck.

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- (c) Such bulkheads shall extend from deck to deck and to the shell or other boundaries.
- (d) Where a main vertical zone is subdivided by horizontal "A" Class divisions into horizontal zones for the purpose of providing an appropriate barrier between sprinklered and non-sprinklered zones of the ship the divisions shall extend between adjacent main vertical zone bulkheads and to the shell or exterior boundaries of the ship and shall be insulated in accordance with the fire insulation and integrity values given in Table 3 of Regulation 98 of this Chapter.
- (e) On ships designed for special purposes, such as automobile or railroad car ferries, where the provision of main vertical zone bulkheads would defeat the purpose for which the ship is intended, equivalent means for controlling and limiting a fire shall be substituted and specifically approved by the Administration.

Provided that in a ship with special category spaces, any such space shall comply with the applicable provisions of Regulation 108 of this Chapter, and in so far as such compliance would be inconsistent with compliance with other requirements of this Part of this Chapter, the requirements of Regulation 108 shall prevail.

Regulation 97

Bulkheads within a Main Vertical Zone

- (a) All bulkheads which are not required to be "A" Class divisions shall be at least "B" Class or "C" Class divisions as prescribed in the tables in Regulation 98

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of this Chapter. All such divisions may be faced with combustible materials in accordance with the provisions of Regulation 105 of this Chapter.

- (b) All corridor bulkheads where not required to be "A" Class shall be "B" Class divisions which shall extend from deck to deck except:
 - (i) when continuous "B" Class ceilings and/or linings are fitted on both sides of the bulkhead, the portion of the bulkhead behind the continuous ceiling or lining shall be of material which in thickness and composition is acceptable in the construction of "B" Class divisions but which shall be required to meet "B" Class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration:
 - (ii) in the case of a ship protected by an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter, the corridor bulkheads of "B" Class materials may terminate at a ceiling in the corridor provided such a ceiling is of material which in thickness and composition is acceptable in the construction of "B" Class divisions. Notwithstanding the requirements of Regulation 98 of this Chapter, such bulkheads and ceilings shall be required to meet "B" Class integrity standards only in so far as is reasonable and practicable in the opinion of the Administration. All doors and frames in such bulkheads shall be of incombustible materials and shall be constructed and erected so as to provide substantial fire resistance to the satisfaction of the Administration.

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

Regulation 98

Fire Integrity of Bulkheads and Decks

- (a) In addition to complying with the specific provisions for fire integrity of bulkheads and decks mentioned elsewhere in the Regulations of this Part, the minimum fire integrity of all bulkheads and decks shall be as prescribed in Tables 1 to 4 in this Regulation. Where, due to any particular structural arrangements in the ship, difficulty is experienced in determining from the tables the minimum fire integrity value of any divisions, such values shall be determined to the satisfaction of the Administration.
- (b) The following requirements shall govern application of the tables:
- (i) Table 1 shall apply to bulkheads bounding main vertical zones or horizontal zones.
- Table 2 shall apply to bulkheads not bounding main vertical zones nor horizontal zones.
- Table 3 shall apply to decks forming steps in main vertical zones or bounding horizontal zones.
- Table 4 shall apply to decks not forming steps in main vertical zones nor bounding horizontal zones.

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- (ii) For the purpose of determining the appropriate fire integrity standards to be applied to boundaries between adjacent spaces, such spaces are classified according to their fire risk as shown in Categories (1) to (14) below. Where the contents and use of a space are such that there is a doubt as to its classification for the purpose of this Regulation, it shall be treated as a space within the relevant category having the most stringent boundary requirements. The title of each category is intended to be typical rather than restrictive. The number in parentheses preceding each category refers to the applicable column or row number in the tables.

(1) Control Stations

Spaces containing emergency sources of power and lighting

Wheelhouse and chartroom

Spaces containing the ship's radio equipment

Fire control and recording stations

Control room for propelling machinery when located outside the propelling machinery space

Spaces containing centralized fire alarm equipment

Spaces containing centralized emergency public address system stations and equipment

(2) Stairways

Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) for passengers and crew and enclosures thereto

In this connection, a stairway which is enclosed at only one level shall be regarded as part of the space from which it is not separated by a fire door.

(3) Corridors

Passenger and crew corridors

(4) Lifeboat and Liferaft Handling and Embarkation Stations

Open deck spaces and enclosed promenades forming lifeboat and liferaft embarkation and lowering stations

(5) Open Deck Spaces

Open deck spaces and enclosed promenades clear of lifeboat and liferaft embarkation and lowering stations

Air space (the space outside superstructures and deckhouses)

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(6) Accommodation Spaces of Minor Fire Risk

Cabins containing furniture and furnishings
of restricted fire risk

Public spaces containing furniture and
furnishings of restricted fire risk and

having a deck area of less than 50 square
metres (540 square feet)

Offices and dispensaries containing furniture
and furnishings of restricted fire risk

(7) Accommodation Spaces of Moderate Fire Risk

Same as (6) above but containing furniture
and furnishings of other than restricted
fire risk

Public spaces containing furniture and
furnishings of restricted fire risk and

having a deck area of 50 square metres
(540 square feet) and greater

Isolated lockers and small storerooms in
accommodation spaces

Sales shops

Motion picture projection and film

stowage rooms

Diet kitchens (containing no open flame)

Cleaning gear lockers (in which inflammable
liquids are not stowed)

Laboratories (in which inflammable
liquids are not stowed)

Pharmacies

Small drying rooms (having a deck area
of 4 square metres (43 square feet) or
less)

Specie rooms

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- (8) Accommodation Spaces of Greater Fire Risk
Public spaces containing furniture and furnishings of other than restricted fire risk and having a deck area of 50 square metres (540 square feet) and greater
Barber shops and beauty parlours
- (9) Sanitary and Similar Spaces
Communal sanitary facilities, showers, baths, water closets, etc.
Small laundry rooms
Indoor swimming pool area
Operating rooms
Isolated serving pantries in accommodation spaces
Private sanitary facilities shall be considered a portion of the space in which they are located
- (10) Tanks, Voids and Auxiliary Machinery Spaces having little or no Fire risk
Water tanks forming part of the ship's structure
Voids and cofferdams
Auxiliary machinery spaces which do not contain machinery having a pressure lubrication system and where storage of combustibles is prohibited, such as:
 ventilation and air conditioning rooms;
 windlass room, steering gear room;
 stabilizer equipment room; electrical propulsion motor room; rooms containing section switchboards and purely

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electrical equipment other than oil-filled electrical transformers (above 10kVA); shaft alleys and pipe tunnels; spaces for pumps and refrigeration machinery (not handling or using inflammable liquids)

Closed trunks serving the spaces listed above

Other closed trunks such as pipe and cable trunks

(11) Auxiliary Machinery Spaces, Cargo Spaces, Special Category Spaces, Cargo and other Oil Tanks and other Similar Spaces of Moderate Fire Risk

Cargo oil tanks

Cargo holds, trunkways and hatchways

Refrigerated chambers

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

Shaft alleys and pipe tunnels allowing storage of combustibles

Auxiliary machinery spaces as in

Category (10) which contain machinery having a pressure lubrication system or where storage of combustibles is permitted

Oil fuel filling stations

Spaces containing oil-filled electrical transformers (above 10kVA)

Spaces containing turbine and reciprocating steam engine driven auxiliary generators and small internal combustion engines up to

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150 h.p. driving emergency generators,
sprinkler, drencher or fire pumps, bilge
pumps, etc.

Special category spaces (Tables 1 and 3 only
apply)

Closed trunks serving the spaces listed above

(12) Machinery Spaces and Main Galleys

Main propelling machinery rooms (other than
electric propulsion motor rooms) and boiler
rooms

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

Main galleys and annexes

Trunks and casings to the spaces listed
above

(13) Storerooms, Workshops, Pantries, etc.

Main pantries not annexed to galleys

Main laundry

Large drying rooms (having a deck area
of more than 4 square metres (43 square
feet))

Miscellaneous stores

Mail and baggage rooms

Garbage rooms

Workshops (not part of machinery spaces,
galleys, etc.)

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(14) Other Spaces in which Inflammable Liquids
are stowed

Lamp rooms

Paint rooms

Storerooms containing inflammable liquids
(including dyes, medicines, etc.)

Laboratories (in which inflammable liquids
are stowed)

- (iii) Where a single value is shown for the fire integrity of a boundary between two spaces, that value shall apply in all cases.
- (iv) In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is not protected by an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.
- (v) In determining the applicable fire integrity standard of a boundary between two spaces within a main vertical zone or horizontal zone which is protected by an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter or between such zones both of which are so protected, the lesser of the two values given in the tables shall apply. In instances where a sprinklered zone and a non-sprinklered zone meet within accommodation and service spaces, the higher of the two values given in the tables shall apply to the division between the zones.

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- (vi) Where adjacent spaces are in the same numerical category and the superscript 1 appears in the tables, a bulkhead or deck between such spaces need not be fitted if deemed unnecessary by the Administration. For example, in Category (12) a bulkhead need not be required between a galley and its annexed pantries provided the pantry bulkheads and decks maintain the integrity of the galley boundaries. A bulkhead is, however, required between a galley and a machinery space even though both spaces are in Category (12).
- (vii) Where the superscript 2 appears in the tables, the lesser insulation value may be permitted only if at least one of the adjoining spaces is protected by an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter.
- (viii) Notwithstanding the provisions of Regulation 97 of this Chapter, there are no special requirements for material or integrity of boundaries where only a dash appears in the tables.
- (ix) The Administration shall determine in respect of Category (5) spaces whether the insulation values in Table 1 or 2 shall apply to ends of deckhouses and superstructures, and whether the insulation values in Table 3 or 4 shall apply to weather decks. In no case shall the requirements of Category (5) of Tables 1 to 4 necessitate enclosure of spaces which in the opinion of the Administration need not be enclosed.

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- (c) Continuous "B" Class ceilings or linings, in association with the relevant decks or bulkheads, may be accepted as contributing, wholly or in part, to the required insulation and integrity of a division.
- (d) In approving structural fire protection details, the Administration shall have regard to the risk of heat transmission at intersections and terminal points of required thermal barriers.

RESOLUTION A.122(V) adopted on 25 October 1967
 AMENDMENTS TO THE INTERNATIONAL
 FOR THE SAFETY OF LIFE AT SEA, 1960

TABLE 1 - BULKHEADS BOUNDING MAIN VERTICAL ZONES OR HORIZONTAL ZONES

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

TABLE 2 - BULKHEADS NOT BOUNDING MAIN VERTICAL ZONES NOR HORIZONTAL ZONES

RESOLUTION A.122(V) adopted on 25 October 1967
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Spaces	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Control stations (1)	B-0 ¹	A-0	A-0	A-0	A-0 B-0	A-60	A-60	A-60	A-0	A-0	A-60	A-60	A-60	A-60
Stairways (2)		A-0 ¹	A-0	A-0	A-0	A-0	A-15 A-0	A-30 A-0	A-0	A-0	A-15	A-30	A-15 A-0	A-30
Corridors (3)			C	A-0	A-0 B-0	B-0	B-15 B-0	B-15 B-0	B-0	A-0	A-15	A-30	A-0	A-30 A-0
Lifeboat and liferaft handling and embarkation stations (4)				-	-	A-0	A-0	A-0	A-0	A-0	A-0	A-15	A-0	A-15 A-0
Open deck space (5)					-	A-0 B-0	A-0 B-0	A-0 B-0	A-0 B-0	A-0	A-0	A-0	A-0 B-0	A-0 B-0
Accommodation spaces of minor fire risk (6)						B-0 C	B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-30	A-0	A-30 A-0
Accommodation spaces of moderate fire risk (7)							B-15 C	B-15 C	B-0 C	A-0	A-15 A-0	A-60	A-15 A-0	A-60 A-15
Accommodation spaces of greater fire risk (8)							B-15 C	B-0 C	A-0	A-30 A-0	A-60	A-15 A-0	A-60 A-15	
Sanitary and similar spaces (9)									C	A-0	A-0	A-0	A-0	A-0
Tanks, voids and auxiliary machinery spaces having little or no fire risk (10)										A-0 ¹	A-0	A-0	A-0	A-0
Auxiliary machinery spaces, cargo spaces, cargo and other oil tanks and other similar spaces of moderate fire risk (11)											A-0 ¹	A-0	A-0	A-30 ² A-15
Machinery spaces and main galleys (12)												A-0	A-0	A-60
Storerooms, workshops, pantries etc. (13)													A-0 ¹	A-0
Other spaces in which inflammable liquids are stowed (14)														A-30 ² A-15

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

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

TABLE 4 - DECKS NOT FORMING STEPS IN MAIN VERTICAL ZONES NOR BOUNDING HORIZONTAL ZONES

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

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Regulation 99

Means of Escape

- (a) In and from all passenger and crew spaces and in spaces in which the crew is normally employed, other than machinery spaces, stairways and ladders shall be arranged to provide ready means of escape to the lifeboat and liferaft embarkation deck. In particular, the following provisions shall be complied with:
- (i) Below the bulkhead deck, two means of escape, at least one of which shall be independent of watertight doors, shall be provided from each watertight compartment or similarly restricted space or group of spaces. Exceptionally, the Administration may dispense with one of the means of escape, due regard being paid to the nature and location of spaces and to the number of persons who normally might be quartered or employed there.
 - (ii) Above the bulkhead deck, there shall be at least two means of escape from each main vertical zone or similarly restricted space or group of spaces at least one of which shall give access to a stairway forming a vertical escape.
 - (iii) At least one of the means of escape required by sub-paragraphs (a)(i) and (ii) of this Regulation shall be by means of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest. However, where an

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Administration has granted dispensation under the provisions of sub-paragraph (a)(i) of this Regulation the sole means of escape shall provide safe escape to the satisfaction of the Administration. The width, number and continuity of the stairways shall be to the satisfaction of the Administration.

- (iv) Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be to the satisfaction of the Administration.
 - (v) Lifts shall not be considered as forming one of the required means of escape.
 - (vi) Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.
 - (vii) If a radiotelegraph station has no direct access to the weather deck, two means of escape shall be provided from such station.
 - (viii) Dead-end corridors exceeding 13 metres (43 feet) shall not be permitted.
- (b) (i) In special category spaces the number and disposition of the means of escape both below and above the bulkhead deck shall be to the satisfaction of the Administration, and in general the safety of access to the embarkation deck shall be at least equivalent to that provided for under sub-paragraphs (a)(i), (ii), (iii), (iv) and (v) of this Regulation.

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- (ii) One of the escape routes from the machinery spaces where the crew is normally employed shall avoid direct access to any special category space.
- (c) Two means of escape shall be provided from each machinery space. In particular, the following provisions shall be complied with:
 - (i) Where the space is below the bulkhead deck the two means of escape shall consist of either:
 - (1) two sets of steel ladders as widely separated as possible leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space; or
 - (2) one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and a steel door capable of being operated from each side and which provides a safe escape route to the embarkation deck.
 - (ii) Where the space is above the bulkhead deck, two means of escape shall be as widely separated as possible and the doors leading from such means of escape shall be in a position from which access is provided to the appropriate lifeboat and liferaft embarkation decks. Where such escapes require the use of ladders these shall be of steel.

Provided that (1) in a ship of less than 1,000 tons gross tonnage, the Administration may dispense with one of the

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means of escape due regard being paid to the width and disposition of the upper part of the space; and (2) in a ship of 1,000 tons gross tonnage and above, the Administration may dispense with one means of escape from any such space so long as either a door or a steel ladder provides a safe escape route to the embarkation deck due regard being paid to the nature and location of the space and whether persons are normally employed in that space.

Regulation 100

Protection of Stairways and Lifts
(in Accommodation and Service Spaces)

- (a) All stairways shall be of steel frame construction except where the Administration sanctions the use of other equivalent material, and shall be within enclosures formed of "A" Class divisions, with positive means of closure at all openings, except that:
- (i) a stairway connecting only two decks need not be enclosed, provided the integrity of the deck is maintained by proper bulkheads or doors at one between deck space. When a stairway is closed at one between deck space, the stairway enclosure shall be protected in accordance with the tables for decks in Regulation 98 of this Chapter;
 - (ii) stairways may be fitted in the open in a public space, provided they lie wholly within such public space.

- (b) Stairway enclosures shall have direct communication with the corridors and be of sufficient area to prevent congestion, having in view the number of persons likely to use them in an emergency. In so far as practicable, stairway enclosures shall not give direct access to cabins, service lockers, or other enclosed spaces containing combustibles in which a fire is likely to originate.
- (c) Lift trunks shall be so fitted as to prevent the passage of smoke and flame from one between deck to another and shall be provided with means of closing so as to permit of draught and smoke control.

Regulation 101

Openings in "A" Class Divisions

- (a) Where "A" Class divisions are pierced for the passage of electric cables, pipes, trunks, ducts, etc. for girders, beams or other structures, arrangements shall be made to ensure that the fire resistance is not impaired, subject to the provisions of paragraph (g) of this Regulation.
- (b) Where of necessity, a ventilation duct passes through a main vertical zone bulkhead, a fail-safe automatic closing fire damper shall be fitted adjacent to the bulkhead. The damper shall also be capable of being manually closed from each side of the bulkhead. The operating position shall be readily accessible and be marked in red light-reflecting colour. The duct between the bulkhead

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and the damper shall be of steel or other equivalent material and, if necessary, to an insulating standard such as to comply with paragraph (a) of this Regulation. The damper shall be fitted on at least one side of the bulkhead with a visible indicator showing if the damper is in the open position.

- (c) Except for hatches between cargo, special category, store, and baggage spaces, and between such spaces and the weather decks, all openings shall be provided with permanently attached means of closing which shall be at least as effective for resisting fires as the divisions in which they are fitted.
- (d) The construction of all doors and door frames in "A" Class divisions, with the means of securing them when closed, shall provide resistance to fire as well as to the passage of smoke and flame, as far as practicable, equivalent to that of the bulkheads in which the doors are situated. Such doors and door frames shall be constructed of steel or other equivalent material. Watertight doors need not be insulated.
- (e) It shall be possible for each door to be opened and closed from each side of the bulkhead by one person only.
- (f) Fire doors in main vertical zone bulkheads and stairway enclosures, other than power operated watertight doors and those which are normally locked, shall be of the self-closing type capable of closing against an inclination of $3\frac{1}{2}$ degrees opposing closure.

The speed of door closure shall, if necessary, be controlled so as to prevent undue danger to personnel. All such doors, except those that are normally closed, shall be capable of release from a control station, either simultaneously or in groups, and also individually from a position at the door. The release mechanism shall be so designed that the door will automatically close in the event of disruption of the control system; however, approved power operated watertight doors will be considered acceptable for this purpose. Hold-back hooks, not subject to control station release, will not be permitted. When double swing doors are permitted, they shall have a latch arrangement which is automatically engaged by the operation of the door release system.

- (g) Where a space is protected by an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter or fitted with a continuous "B" Class ceiling, openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "A" Class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration.
- (h) The requirements for "A" Class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "A" Class integrity shall not apply to exterior doors in superstructures and deckhouses.

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Regulation 102

Openings in "B" Class Divisions

- (a) Where "B" Class divisions are penetrated for the passage of electrical cables, pipes, trunks, ducts, etc., or for the fitting of ventilation terminals, lighting fixtures and similar devices, arrangements shall be made to assure that the fire resistance is not impaired.
- (b) Doors and door frames in "B" Class divisions and means of securing them shall provide a method of closure which shall have resistance to fire as far as practicable equivalent to the divisions except that ventilation openings may be permitted in the lower portion of such doors. Where such opening is in or under a door the total net area of any such opening or openings shall not exceed 0.05 square metres (78 square inches). When such opening is cut in a door it shall be fitted with a grill made of incombustible material. Doors shall be incombustible.
- (c) The requirements for "B" Class integrity of the outer boundaries of a ship shall not apply to glass partitions, windows and sidescuttles. Similarly, the requirements for "B" Class integrity shall not apply to exterior doors in superstructures and deckhouses.
- (d) Where an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter is fitted:

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- (i) openings in decks not forming steps in main vertical zones nor bounding horizontal zones shall be closed reasonably tight and such decks shall meet the "B" Class integrity requirements in so far as is reasonable and practicable in the opinion of the Administration, and
- (ii) openings in corridor bulkheads of "B" Class materials shall be protected in accordance with the provisions of Regulation 97 of this Chapter.

Regulation 103

Ventilation Systems

- (a) In general, the ventilation fans shall be so disposed that the ducts reaching the various spaces remain within the main vertical zone.
- (b) Where ventilation systems penetrate decks, precautions shall be taken, in addition to those relating to the fire integrity of the deck required by Regulation 101 of this Chapter, to reduce the likelihood of smoke and hot gases passing from one between deck space to another through the system. In addition to insulation requirements contained in this Regulation, vertical ducts shall, if necessary be insulated as required by the appropriate tables in Regulation 98 of this Chapter.
- (c) The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the space being ventilated.

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- (d) Except in cargo spaces, ventilation ducts shall be constructed of the following materials:
- (i) Ducts not less than 750 square centimetres (116 square inches) in sectional area and all vertical ducts serving more than a single between deck space shall be constructed of steel or other equivalent material.
 - (ii) Ducts less than 750 square centimetres (116 square inches) in sectional area shall be constructed of incombustible materials. Where such ducts penetrate "A" or "B" Class divisions due regard shall be given to ensuring the fire integrity of the division.
 - (iii) Short lengths of duct, not in general exceeding 200 square centimetres (31 square inches) in sectional area nor 2 metres (79 inches) in length, need not be incombustible provided that all of the following conditions are met:
 - (1) the duct is constructed of a material of restricted fire risk to the satisfaction of the Administration;
 - (2) the duct is used only at the terminal end of the ventilation system; and
 - (3) the duct is not located closer than 60 centimetres (24 inches) measured along its length to a penetration of an "A" or "B" Class division, including continuous "B" Class ceilings.

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- (e) Where a stairway enclosure is ventilated, the duct or ducts (if any) shall be taken from the fan room independently of other ducts in the ventilation system, and shall not serve any other space.
- (f) All power ventilation, except machinery and cargo space ventilation and any alternative system which may be required under paragraph (h) of this Regulation, shall be fitted with controls so grouped that all fans may be stopped from either of two separate positions which shall be situated as far apart as practicable. Controls provided for the power ventilation serving machinery spaces shall also be grouped so as to be operable from two positions, one of which shall be outside such spaces. Fans serving power ventilation systems to cargo spaces shall be capable of being stopped from a safe position outside such spaces.
- (g) Where they pass through accommodation spaces or spaces containing combustible materials, the exhaust ducts from galley ranges shall be constructed of "A" Class divisions. Each exhaust duct shall be fitted with:
 - (i) a grease trap readily removable for cleaning;
 - (ii) a fire damper located in the lower end of the duct;
 - (iii) arrangements, operable from within the galley, for shutting off the exhaust fan; and
 - (iv) fixed means for extinguishing a fire within the duct.

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- (h) Such measures as are practicable shall be taken in respect of control stations outside machinery spaces in order to ensure that ventilation, visibility and freedom from smoke are maintained, so that in the event of fire the machinery and equipment contained therein may be supervised and continue to function effectively. Alternative and separate means of air supply shall be provided; air inlets of the two sources of supply shall be so disposed that the risk of both inlets drawing in smoke simultaneously is minimized. At the discretion of the Administration, such requirements need not apply to control stations situated on, and opening on to, an open deck, or where local closing arrangements would be equally effective.
- (i) Ducts provided for ventilation of machinery spaces of Category A shall not in general pass through accommodation, service spaces or control stations, except that the Administration may permit relaxation from this requirement, provided that:
 - (i) the ducts are constructed of steel, and are insulated to A-60 standard, or
 - (ii) the ducts are constructed of steel and are fitted with an automatic fire damper close to the boundary penetrated and are insulated to A-60 standard from the machinery space to a point at least 5 metres (16 feet) beyond the fire damper.

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- (j) Ducts provided for ventilation of accommodation, service spaces, or control stations shall not in general pass through machinery spaces of Category A, except that the Administration may permit relaxation from this requirement provided that the ducts are constructed of steel and automatic fire dampers are fitted close to the boundaries penetrated.

Regulation 104

Windows and Sidescuttles

- (a) All windows and sidescuttles in bulkheads within accommodation and service spaces and control stations, other than those to which the provisions of Regulations 101(h) and 102(c) of this Chapter apply, shall be constructed so as to preserve the integrity requirements of the type of bulkhead in which they are fitted.
- (b) Notwithstanding the requirements of the tables in Regulation 98 of this Chapter;
- (i) All windows and sidescuttles in bulkheads separating accommodation and service spaces and control stations from weather shall be constructed with frames of steel or other suitable material. The glass shall be retained by a metal glazing bead or angle.
- (ii) Special attention shall be given to the fire integrity of windows facing open or enclosed lifeboat and liferaft embarkation areas and to windows situated below such areas in such a position that their failure during a fire would impede the launching of, or embarkation into, lifeboats or liferafts.

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Regulation 105

Restriction of Combustible Materials

- (a) Except in cargo spaces, mail rooms, baggage rooms, or refrigerated compartments of service spaces, all linings, grounds, ceilings and insulations shall be of incombustible materials. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of incombustible material.
- (b) Vapour barriers and adhesives used in conjunction with insulation, as well as insulation of pipe fittings, for cold service systems need not be incombustible, but they shall be kept to the minimum quantity practicable and their exposed surfaces shall have qualities of resistance to the propagation of flame to the satisfaction of the Administration.
- (c) Bulkheads, linings and ceilings in all accommodation and service spaces may have combustible veneer, provided that such veneer shall not exceed 2.0 millimetres (one twelfth inch) within any such spaces except corridors, stairway enclosures and control stations where it shall not exceed 1.5 millimetres (one seventeenth inch).
- (d) The total volume of combustible facings, mouldings, decorations and veneers in any accommodation and service space shall not exceed a volume equivalent to 2.5 millimetres (one tenth inch) veneer on the combined area of the walls and ceilings. In the case of ships fitted with an automatic sprinkler system complying with the provisions of Regulation 120 of this Chapter, the above volume may include some combustible material used for erection of "C" Class divisions.

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- (e) All exposed surfaces in corridors or stairway enclosures and surfaces in concealed or inaccessible spaces in accommodation and service spaces and control stations shall have low flame spread characteristics.
- (f) Furniture in the passages and stairway enclosures shall be kept to a minimum.
- (g) Paints, varnishes and other finishes used on exposed interior surfaces shall not be of a nature to offer an undue fire hazard in the judgment of the Administration and shall not be capable of producing excessive quantities of smoke or other toxic properties.
- (h) Primary deck coverings, if applied, within accommodation and service spaces and control stations, shall be of approved material which will not readily ignite, or give rise to toxic or explosive hazards at elevated temperatures.
- (i) Waste paper receptacles shall be constructed of incombustible materials and with solid sides and bottoms.

Regulation 106

Miscellaneous Items

Requirements Applicable to all Portions of the Ship

- (a) Pipes penetrating "A" or "B" Class divisions shall be of a material approved by the Administration having regard to the temperature such divisions are required to withstand. Pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk. Materials readily rendered ineffective by heat shall

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not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the waterline and where the failure of the material in the event of fire would give rise to danger of flooding.

Requirements Applicable to Accommodation and Service Spaces, Control Stations, Corridors and Stairways

- (b) (i) Air spaces enclosed behind ceilings, panelling or linings shall be suitably divided by close-fitting draught stops not more than 14 metres (46 feet) apart.
- (ii) In the vertical direction, such spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.
- (c) The construction of ceiling and bulkheading shall be such that it will be possible, without impairing the efficiency of the fire protection, for the fire patrols to detect any smoke originating in concealed and inaccessible places, except where in the opinion of the Administration there is no risk of fire originating in such places.
- (d) Electric radiators, if used, shall be fixed in position and so constructed as to reduce fire risks to a minimum. No such radiators shall be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.
- (e) Cellulose-nitrate-based films shall not be used for cinematograph installations.

Regulation 107

Provision of an Automatic Sprinkler and Fire Alarm and Fire Detection System or an Automatic Fire Alarm and Fire Detection System

In any ship to which the Regulations in this Part of this Chapter apply, there shall be installed throughout each separate

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zone, whether vertical or horizontal, in all accommodation and service spaces and, where it is considered necessary by the Administration, in control stations, except spaces which afford no substantial fire risk (such as void spaces, sanitary spaces, etc.) either:

- (i) an automatic sprinkler and fire alarm and fire detection system of an approved type, complying with the provisions of Regulation 120 of this Chapter and installed and so arranged as to protect such spaces, or
- (ii) an automatic fire alarm and fire detection system of an approved type, complying with the provisions of Regulation 121 of this Chapter, and installed and so arranged as to detect the presence of fire in such spaces.

Regulation 108

Protection of Special Category Spaces

Provisions applicable to Special Category Spaces whether above or below the Bulkhead Deck

(a) General

- (i) The basic principle underlying the provisions in this Regulation is that as normal main vertical zoning may not be practicable in special category spaces, equivalent protection must be obtained in such spaces on the basis of a horizontal zone concept and the provision of an efficient fixed fire extinguishing system. Under this concept a horizontal zone for the purpose of this Regulation may include special category spaces on more than one deck provided that the overall height of the zone does not exceed 10 metres (33 feet).

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- (ii) All requirements laid down in Regulations 101 and 103 of this Chapter for maintaining the integrity of vertical zones shall be applied equally to decks and bulkheads forming the boundaries separating horizontal zones from each other and from the remainder of the ship.
- (b) Structural Protection
 - (i) Boundary bulkheads of special category spaces shall be insulated as required for Category (11) spaces in Table 1 of Regulation 98 of this Chapter and the horizontal boundaries as required for Category (11) spaces in Table 3 of that Regulation.
 - (ii) Indicators shall be provided on the navigating bridge which shall indicate when any fire door leading to or from the special category spaces is closed.
- (c) Fixed Fire Extinguishing System

Each special category space shall be fitted with an approved fixed pressure water-spraying system for manual operation which shall protect all parts of any deck and vehicle platform, if any, in such space, provided that the Administration 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.

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(d) Patrols and Detection

- (i) An efficient patrol system shall be maintained in special category spaces. In any such space 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 system of an approved type.
- (ii) Manual fire alarms shall be provided as necessary throughout the special category spaces and one shall be placed close to each exit from such spaces.

(e) Fire Extinguishing Equipment

There shall be provided in each special category space:

- (i) a number of hydrants with hoses and dual purpose nozzles of an approved type 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 such space;
- (ii) at least three water fog applicators;
- (iii) one portable applicator unit complying with the provisions of Regulation 115(d) of this Chapter, provided that at least two such units are available in the ship for use in such spaces;
and
- (iv) such number of portable fire extinguishers of an approved type as the Administration may deem sufficient.

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(f) Ventilation System

- (i) There shall be provided an effective power ventilation system for the special category spaces sufficient to give at least 10 air changes per hour. The system for such spaces shall be entirely separated from other ventilation systems and shall be operating at all times when vehicles are in such spaces. The Administration may require an increased number of air changes when vehicles are being loaded and unloaded.
- (ii) The ventilation shall be such as to prevent air stratification and the formation of air pockets.
- (iii) Means shall be provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity.

Additional Provisions Applicable only to Special Category Spaces above the Bulkhead Deck

(g) Scuppers

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or decks consequent on the operation of the fixed pressure water-spraying system, scuppers shall be fitted so as to ensure that such water is rapidly discharged directly overboard.

(h) Precautions against Ignition of Inflammable Vapours

- (i) Equipment which may constitute a source of ignition of inflammable vapours and in particular electrical equipment and wiring, shall be installed at least 45 centimetres (18 inches) above the deck, provided that if the Administration is satisfied that the installation of such

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electrical equipment and wiring below this level is necessary for the safe operation of the ship, such electrical equipment and wiring shall be of a type approved for use in an explosive petrol and air mixture. Electrical equipment installed at more than 45 centimetres (18 inches) above the deck shall be of a type so enclosed and protected as to prevent the escape of sparks. The reference to a level of 45 centimetres (18 inches) above the deck shall be construed to mean each deck on which vehicles are carried and on which explosive vapours might be expected to accumulate.

- (ii) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Additional Provisions applicable only to Special Category Spaces below the Bulkhead Deck

(i) Bilge Pumping and Drainage

In view of the serious loss of stability which could arise due to large quantities of water accumulating on the deck or tank top consequent on the operation of the fixed pressure water-spraying system, the Administration may require pumping and drainage facilities to be provided additional to the requirements of Regulation 18 of this Chapter.

(j) Precautions against Ignition of Inflammable Vapours

- (i) Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol

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and air mixtures. Other equipment which may constitute a source of ignition of inflammable vapours shall not be permitted.

- (ii) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Regulation 109

Protection of Cargo Spaces
(other than Special Category Spaces)
containing Motor Vehicles with Fuel in their Tanks for
their own Propulsion

In any cargo space (other than special category spaces) containing motor vehicles with fuel in their tanks for their own propulsion, the following provisions shall be complied with:

(a) Fire Detection

There shall be provided an approved fire detection and fire alarm system.

(b) Fire Extinguishing Arrangements

- (i) There shall be fitted a fixed gas fire extinguishing system which shall comply with the provisions of Regulation 116 of this Chapter, except that if a carbon dioxide system is fitted, the quantity of gas available shall be at least sufficient to give a minimum volume of free gas equal to 45 per cent of the gross volume of the largest such cargo space which is capable of being sealed, and the arrangements shall be such as to ensure that the gas is

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introduced rapidly and effectively into the space. Any other fixed gas fire extinguishing system or fixed high expansion froth fire extinguishing system may be fitted provided it gives equivalent protection.

- (ii) There shall be provided for use in any such space such number of portable fire extinguishers of an approved type as the Administration may deem sufficient.

(c) Ventilation System

- (i) In any such cargo space there shall be provided an effective power ventilation system sufficient to give at least 10 air changes per hour. The system for such cargo spaces shall be entirely separated from other ventilation systems and shall be operating at all times when vehicles are in such spaces.
- (ii) The ventilation shall be such as to prevent air stratification and the formation of air pockets.
- (iii) Means shall be provided to indicate on the navigating bridge any loss or reduction of the required ventilating capacity.

(d) Precautions against Ignition of Inflammable Vapours

- (i) Electrical equipment and wiring, if fitted, shall be of a type suitable for use in explosive petrol and air mixtures. Other equipment which may constitute a source of ignition of inflammable vapours shall not be permitted.
- (ii) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type

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approved for use in explosive petrol and air mixture and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Regulation 110

Arrangements for Oil Fuel, Lubricating Oil
and other Inflammable Oils

(a) Oil Fuel Arrangements

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

- (i) No oil fuel which has a flashpoint of less than 61°C (141°F) (closed cup test) as determined by an approved flashpoint apparatus shall be used as fuel, except in emergency generators, in which case the flashpoint shall be not less than 43°C (110°F).

Provided that the Administration may permit the general use of fuel oil having a flashpoint of not less than 43°C (110°F) subject to such additional precautions as it may consider necessary and on condition that the temperature of the space in which such fuel is stored or used shall not be allowed to rise to within 10°C (18°F) below the flashpoint of the fuel.

- (ii) As far as practicable, no part of the oil fuel system containing heated oil under pressure exceeding 1.8 kilogrammes per square centimetre (25 pounds per square inch) gauge shall be so

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concealed that defects and leakage cannot readily be observed. In way of such parts of the oil fuel system the machinery space shall be adequately illuminated.

- (iii) The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent accumulation of oil vapour.
- (iv) (1) As far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of Category A. When oil fuel tanks, except double bottom tanks, are necessarily located adjacent to machinery spaces of Category A, they shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery space shall be kept to a minimum. In general, the use of free-standing oil fuel tanks shall be avoided but when such tanks are employed they shall not be situated in machinery spaces of Category A.
- (2) No oil tank shall be situated where spillage or leakage therefrom can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

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- (v) Every oil fuel pipe which if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom shall be fitted with a cock or valve on the tank capable of being closed from a safe position outside the space concerned in the event of a fire arising in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tanks shall be fitted but control in event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space.
- (vi) Safe and efficient means of ascertaining the amount of oil fuel contained in any oil tank shall be provided. Sounding pipes with suitable means of closure may be permitted if their upper ends terminate in safe positions. Other means of ascertaining the amount of oil fuel contained in any oil fuel tank may be permitted if they do not require penetration below the top of the tank, and providing their failure or overfilling of the tanks will not permit release of fuel thereby.
- (vii) Provision shall be made to prevent over-pressure in any oil tank or in any part of the oil fuel system, including the filling pipes. Any relief valves and air or overflow pipes shall discharge to a position which, in the opinion of the Administration, is safe.

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(viii) Oil fuel pipes shall be of steel or other approved material, provided that restricted use of flexible pipes shall be permissible in positions where the Administration is satisfied that they are necessary. Such flexible pipes and end attachments shall be of approved fire resisting materials of adequate strength and shall be constructed to the satisfaction of the Administration.

(b) Lubricating Oil Arrangements

The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ships and persons on board, and such arrangements in machinery spaces of Category A and, whenever practicable, in other machinery spaces shall at least comply with the provisions of sub-paragraphs (ii), (iv)(2), (v), (vi) and (vii) of paragraph (a) of this Regulation.

(c) Arrangements for other Inflammable Oils

The arrangements for the storage, distribution and utilization of other inflammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. In locations where means of ignition are present such arrangements shall at least comply with the provisions of sub-paragraphs (iv)(2) and (vi), and with the provisions of sub-paragraph (viii) in respect of strength and construction, of paragraph (a) of this Regulation.

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Regulation 111

Openings in Machinery Spaces and Means for
Closing such Openings, for Stopping Machinery
and for Shutting off Oil Fuel Suction Pipes

- (a) The provisions of this Regulation shall apply to machinery spaces of Category A and, where the Administration considers it desirable, to other machinery spaces.
- (b) (i) The number of skylights, doors, ventilators, openings in funnels to permit exhaust ventilation and other openings to machinery spaces shall be reduced to a minimum consistent with the needs of ventilation and the proper and safe working of the ship.
 - (ii) The flaps of such skylights where fitted shall be of steel. Suitable arrangements shall be made to permit the release of smoke in the event of fire, from the space to be protected.
 - (iii) Such doors other than power-operated watertight doors shall be arranged so that positive closure is assured in case of fire in the space, by power-operated closing arrangements or by the provision of self-closing doors capable of closing against an inclination of 3 1/2 degrees opposing closure and having a fail-safe hook-back facility, provided with a remotely operated release device.
- (c) Windows shall not be fitted in machinery space casings.
- (d) Means of control shall be provided for:
 - (i) opening and closure of skylights, closure of openings in funnels which normally allow exhaust ventilation, and closure of ventilator dampers;

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- (ii) permitting the release of smoke;
 - (iii) closure of power-operated doors or release mechanism on doors other than power-operated watertight doors;
 - (iv) stopping ventilating fans; and
 - (v) stopping forced and induced draught fans, oil fuel transfer pumps, oil fuel unit pumps and other similar fuel pumps.
- (e) The controls required for ventilating fans shall comply with the provisions of Regulation 103(f) of this Chapter. The controls for any required fixed fire extinguishing system and those required by sub-paragraphs (d)(i), (ii), (iii) and (v) of this Regulation and of Regulation 110(a)(v) of this Chapter shall be situated at one control position, or grouped in as few positions as possible to the satisfaction of the Administration. Such position or positions shall be located where they will not be cut off in the event of fire in the space they serve, and shall have a safe access from the open deck.

Regulation 112

Maintenance of Fire Patrols etc., and
Provision of Fire Extinguishing Equipment

- (a) Fire Patrols and Detection, Alarms and Public Address Systems
- (i) An efficient patrol system shall be maintained so that an outbreak of fire may be promptly detected. Each member of the fire patrol shall be trained to be familiar with the arrangements of the ship as well as the location and operation of any equipment he may be called upon to use.

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- (ii) Manual alarms shall be fitted throughout the accommodation and service spaces to enable the fire patrol to give an alarm immediately to the bridge or main fire control station.
- (iii) An approved fire alarm or fire detecting system shall be provided which will automatically indicate at one or more suitable points or stations the presence or indication of fire and its location in any cargo space which, in the opinion of the Administration, is not accessible to the patrol system, except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.
- (iv) The ship shall at all times when at sea, or in port (except when out of service), be so manned or equipped as to ensure that any initial fire alarm is immediately received by a responsible member of the crew.
- (v) A special alarm, operated from the bridge or 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.
- (vi) A public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations.

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(b) Fire Pumps and Fire Main System

The ship shall be provided with fire pumps, fire main system, hydrants and hoses complying with the provisions of Regulation 113 of this Chapter and shall comply with the following requirements:

- (i) In a ship of 4,000 tons gross tonnage and upwards, there shall be provided at least three independently driven fire pumps and, in a ship of less than 4,000 tons gross tonnage, at least two such fire pumps.
- (ii) In a ship of 1,000 tons gross tonnage and upwards, the arrangement of sea connections, fire pumps and sources of power for operating them shall be such as to ensure that a fire in any one compartment will not put all the fire pumps out of action.
- (iii) In a ship of 1,000 tons gross tonnage and upwards, the arrangement of fire pumps, fire mains and hydrants shall be such that at least one effective jet of water as stipulated in Regulation 113(c) of this Chapter 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 required fire pump.
- (iv) In a ship of less than 1,000 tons gross tonnage the arrangements shall be to the satisfaction of the Administration.

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(c) Fire Hydrants, Hoses and Nozzles

- (i) The ship shall be provided with fire hoses the number and diameter of which shall be to the satisfaction of the Administration. There shall be at least one fire hose for each of the hydrants required by Regulation 113(d) of this Chapter and these hoses shall be used only for the purposes of extinguishing fires or testing the fire extinguishing apparatus at fire drills and surveys.
- (ii) In accommodation and service spaces and in machinery spaces, the number and position of hydrants shall be such that the requirements of Regulation 113(d) of this Chapter may be complied with when all watertight doors and all doors in main vertical zone bulkheads are closed.
- (iii) The arrangements shall be such that at least two jets of water can reach any part of any cargo space when empty.
- (iv) All required hydrants in machinery spaces shall be fitted with hoses having in addition to the nozzles required in Regulation 113(g) of this Chapter nozzles suitable for spraying water on oil, or alternatively dual purpose nozzles. Additionally, each machinery space of Category A shall be provided with at least two suitable water fog applicators*.

* A water fog applicator might consist of a metal "L" shaped pipe, the long limb being about 2 metres (6 feet) in length capable of being fitted to a fire hose and the short limb being about $\frac{1}{4}$ metre (10 inches) in length fitted with a fixed water fog nozzle or capable of being fitted with a water spray nozzle.

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- (v) Water spray nozzles or 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.
 - (vi) For each pair of breathing apparatus there shall be provided one water fog applicator which shall be stored adjacent to such apparatus.
 - (vii) 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 other space or spaces there shall be provided in one of those spaces two hydrants fitted with hoses with dual purpose nozzles near the entrance to the machinery space of Category A. Such provision need not be made when the tunnel or adjacent spaces are not part of an escape route.
- (d) International Shore Connection
- (i) A ship of 1,000 tons gross tonnage and upwards shall be provided with at least one international shore connection, complying with the provisions of Regulation 56(h) of this Chapter.
 - (ii) Facilities shall be available enabling such a connection to be used on either side of the ship.
- (e) Portable Fire Extinguishers in Accommodation and Service Spaces and Control Stations

The ship shall be provided in accommodation and service spaces and control stations with such approved portable fire extinguishers as the Administration may deem to be appropriate and sufficient.

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(f) Fixed Fire Extinguishing Arrangements in Cargo Spaces

- (i) The cargo spaces of ships of 1,000 tons gross tonnage and upwards shall be protected by a fixed gas fire extinguishing system complying with the provisions of Regulation 116 of this Chapter, or by a fixed high expansion froth fire extinguishing system which gives equivalent protection.
- (ii) Where it is shown to the satisfaction of the Administration that a ship is engaged on voyages of such short duration that it would be unreasonable to apply the requirements of sub-paragraph (i) of this paragraph and also in ships of less than 1,000 tons gross tonnage, the arrangements in cargo spaces shall be to the satisfaction of the Administration.

(g) Fire Extinguishing Appliances in Boiler Rooms, etc.

Spaces containing oil-fired boilers or oil fuel units shall be provided with the following arrangements.

- (i) There shall be any one of the following fixed fire extinguishing systems:
 - (1) A pressure water-spraying system complying with the provisions of Regulation 119 of this Chapter;
 - (2) A gas system complying with the provisions of Regulation 116 of this Chapter;
 - (3) A froth system complying with the provisions of Regulation 117 of this Chapter;

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- (4) A high expansion froth system complying with the provisions of Regulation 118 of this Chapter.

In each case if the engine and boiler rooms are not entirely separate, or if fuel oil can drain from the boiler room into the engine room, the combined engine and boiler rooms shall be considered as one compartment.

- (ii) There shall be in each boiler room at least one set of portable air-froth equipment complying with the provisions of Regulation 115(d) of this Chapter.
- (iii) There shall be at least two approved portable extinguishers discharging froth or equivalent in each firing space in each boiler room and each space in which a part of the oil fuel installation is situated. There shall be not less than one approved froth type extinguisher of at least 136 litres (30 gallons) capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room.
- (iv) In each firing space there shall be a receptacle containing sand, sawdust impregnated with soda or other approved dry material, in such quantity as may be required by the Administration. Alternatively an approved portable extinguisher may be substituted therefor.

(h) Fire Extinguishing Appliances in Spaces containing Internal Combustion Type Machinery

Spaces containing internal combustion machinery used either (1) for main propulsion, or (2) for other purposes when such machinery has in the aggregate a total power not less than 500 b.h.p., shall be provided with the following arrangements:

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- (i) There shall be one of the fire extinguishing systems required by sub-paragraph (g)(1) of this Regulation.
 - (ii) There shall be at least one set of portable air-froth equipment complying with the provisions of Regulation 115(d) of this Chapter.
 - (iii) There shall be in each such space approved froth type fire extinguishers each of at least 45 litres (10 gallons) capacity or equivalent sufficient in number to enable froth or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable froth extinguishers or equivalent which shall be so located that an extinguisher is not more than 10 metres (33 feet) walking distance from any point in the space; provided that there shall be at least two such extinguishers in each such space.
- (i) Fire Extinguishing Arrangements in Spaces containing Steam Turbines or enclosed Steam Engines

In spaces containing steam turbines or enclosed steam engines used either (1) for main propulsion or (2) for other purposes when such machinery has in the aggregate a total of not less than 500 b.h.p., there shall be provided:

- (i) froth fire extinguishers each of at least 45 litres (10 gallons) capacity or equivalent sufficient in number to enable froth or its equivalent to be directed on to any part of the pressure lubrication system, on to any part of the casings enclosing pressure lubricated parts of the turbines, engines or associated gearing, and any other fire hazards.

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Provided that such extinguishers shall not be required if protection at least equivalent to this sub-paragraph is provided in such spaces by a fixed fire extinguishing system fitted in compliance with sub-paragraph (g)(i) of this Regulation.

- (ii) There shall be provided a sufficient number of portable froth extinguishers or equivalent which shall be so located that an extinguisher is not more than 10 metres (33 feet) walking distance from any point in the space; provided that (1) there shall be at least two such extinguishers in each such space, and (2) such extinguishers shall not be required in addition to any provided in compliance with sub-paragraph (h)(iii) of this Regulation.

(j) Fire Extinguishing Appliances in other Machinery Spaces

Where, in the opinion of the Administration, a fire hazard exists in any machinery space for which no specific provisions for fire extinguishing appliances are prescribed in paragraphs (g), (h) and (i) of this Regulation there shall be provided in, or adjacent to, that space such number of approved portable fire extinguishers or other means of fire extinction as the Administration may deem sufficient.

(k) Fixed Fire Extinguishing Appliances not required by this Part

Where a fixed fire extinguishing system not required by this Part of this Chapter is installed, such a system shall be to the satisfaction of the Administration.

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(1) Special Requirements for Machinery Spaces

(i) For 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.

(ii) An automatic fire detection and alarm system shall be fitted when the Administration considers such special precautions warranted in any machinery space in which the installation of automatic and remote control systems and equipment have been approved in lieu of continuous manning of the space.

(m) Fireman's Outfits and Personal Equipment

Fireman's outfits and sets of personal equipment shall be provided in accordance with the provisions of Regulation 64(j) of this Chapter.

Regulation 113

Detailed Requirements applicable to Fire Pumps, Fire Main, Hydrants and Hoses

(a) Total Capacity of Fire Pumps

The required fire pumps shall be capable of delivering for fire-fighting purposes a quantity of water, at the appropriate pressure prescribed below, not less than two-thirds of the quantity required to be dealt with by the bilge pumps when employed for bilge pumping.

(b) Fire Pumps

(i) The fire pumps shall be independently driven. Sanitary, ballast, bilge or general service pumps may be accepted as fire pumps, provided that they

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are not normally used for pumping oil and that if they are subject to occasional duty for the transfer or pumping of fuel oil, suitable change-over arrangements are fitted.

- (ii) Each of the required fire pumps shall have a capacity not less than 80 per cent of the total required capacity divided by the minimum number of required fire pumps and each such pump shall in any event be capable of delivering at least the two required jets of water. These fire pumps shall be capable of supplying the fire main system under the required conditions.
 - (iii) Where more pumps than the minimum number of required pumps are installed the capacity of such additional pumps shall be to the satisfaction of the Administration.
 - (iv) 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 water service pipes, hydrants and hoses. These valves shall be so placed and adjusted as to prevent excessive pressure in any part of the fire main system.
- (c) Pressure in the Fire Main System
- (i) The diameter of the fire main shall be sufficient for the effective distribution of the maximum required discharge from two fire pumps operating simultaneously.
 - (ii) With the two pumps simultaneously delivering through nozzles specified in paragraph (g) of this Regulation, the quantity of water specified in sub-paragraph (i) of this paragraph, through any

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adjacent hydrants, the following minimum pressures shall be maintained at all hydrants.

In ships of 4,000 tons gross tonnage and upwards	3.2 kilogrammes per square centimetre (45 pounds per square inch)
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In ships of 1,000 tons gross tonnage and upwards, but under 4,000 tons gross tonnage	2.8 kilogrammes per square centimetre (40 pounds per square inch)
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In ships of under 1,000 tons gross tonnage	To the satisfaction of the Administration
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(d) Number and Position of Hydrants

The number and position of the hydrants shall be such that at least two jets of water not emanating from the same hydrant, one of which shall be from a single length of hose, may reach any part of the ship normally accessible to the passengers or crew while the ship is being navigated.

(e) Pipes and Hydrants

(i) Materials readily rendered ineffective by heat shall not be used for fire mains and hydrants unless adequately protected. The pipes and hydrants shall be so placed that the fire hoses may be easily coupled to them. In ships where deck cargo may be carried, the positions of the hydrants shall be such that they are always readily accessible and the pipes shall be arranged as far as practicable to avoid risk of damage by such cargo. Unless there is provided one hose and nozzle for each hydrant in the ship, there shall be complete interchangeability of hose couplings and nozzles.

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- (ii) A cock or valve shall be fitted to serve each fire hose so that any fire hose may be removed while the fire pumps are at work.

(f) Fire Hoses

Fire hoses shall be of material approved by the Administration and sufficient in length to project a jet of water to any of the spaces in which they may be required to be used. Their maximum length shall be to the satisfaction of the Administration. Each hose shall be provided with a nozzle and the necessary couplings. Hoses specified in these Regulations as "fire hoses" shall together with any necessary fittings and tools be kept ready for use in conspicuous positions near the fire hydrants or connections. Additionally, in interior locations, fire hoses shall be connected to the hydrants at all times.

(g) Nozzles

- (i) For the purposes of this Part, standard nozzle sizes shall be 12 millimetres ($\frac{1}{2}$ inch), 16 millimetres ($\frac{5}{8}$ inch) and 19 millimetres ($\frac{3}{4}$ inch), or as near thereto as possible. Larger diameter nozzles may be permitted at the discretion of the Administration.
- (ii) For accommodation and service spaces, a nozzle size greater than 12 millimetres ($\frac{1}{2}$ inch) need not be used.
- (iii) For machinery spaces and exterior locations, the nozzle size shall be such as to obtain the maximum discharge possible from two jets at the pressure mentioned in paragraph (c) of this Regulation from the smallest pump, provided that a nozzle size greater than 19 millimetres ($\frac{3}{4}$ inch) need not be used.

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Regulation 114

Ready Availability of Fire Extinguishing Appliances

Fire extinguishing appliances shall be kept in good order and available for immediate use at all times during the voyage.

Regulation 115

Fire Extinguishers

- (a) All fire extinguishers shall be of approved types and designs.
 - (i) The capacity of required portable fluid extinguishers shall be not more than $13\frac{1}{2}$ litres (3 gallons) and not less than 9 litres (2 gallons). Other extinguishers shall not be in excess of the equivalent portability of the $13\frac{1}{2}$ litre (3 gallon) fluid extinguisher and shall not be less than the fire extinguishing equivalent of a 9 litre (2 gallon) fluid extinguisher.
 - (ii) The Administration shall determine the equivalents of fire extinguishers.
- (b) Spare charges shall be provided in accordance with requirements to be specified by the Administration.
- (c) Fire extinguishers containing an extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.
- (d) A portable froth applicator unit shall consist of an inductor type of air-froth nozzle capable of being connected to the fire main by a fire hose, together with a portable tank containing at least 20 litres ($4\frac{1}{2}$ gallons) of froth-making liquid and one spare tank.

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The nozzle shall be capable of producing effective froth suitable for extinguishing an oil fire, at the rate of at least 1.5 cubic metres (53 cubic feet) per minute.

- (e) Fire extinguishers shall be periodically examined and subjected to such tests as the Administration may require.
- (f) One of the portable fire extinguishers intended for use in any space shall be stowed near the entrance to that space.

Regulation 116

Fixed Gas Fire Extinguishing System

- (a) The use of a fire extinguishing medium which, in the opinion of the Administration, either by itself or under expected conditions of use gives off toxic gases in such quantities as to endanger persons shall not be permitted.
- (b) Where provision is made for the injection of gas for fire extinguishing purposes, the necessary pipes for conveying the gas shall be provided with control valves or cocks so marked as to indicate clearly the compartments to which the pipes are led. Suitable provision shall be made to prevent inadvertent admission of the gas to any compartment. Where cargo spaces fitted with such a system for fire protection are used as passenger spaces the gas connection shall be blanked during such use.
- (c) The piping shall be arranged so as to provide effective distribution of fire extinguishing gas.
- (d) (i) 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.

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(ii) When carbon dioxide is used as an extinguishing medium for machinery spaces of Category A the quantity of gas carried shall be sufficient to give a minimum quantity of free gas equal to the larger of the following quantities, either:

- (1) 40 per cent of the gross volume of the largest space, the volume to include the casing up to the level at which the horizontal area of the casing is 40 per cent or less of the horizontal area of the space concerned taken midway between the tank top and the lowest part of the casings; or
- (2) 35 per cent of the entire volume of the largest space including the casing;

provided that if two or more machinery spaces of Category A are not entirely separate they shall be considered as forming one compartment.

(iii) 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 release of air within that space would seriously affect the efficiency of the fixed fire extinguishing installation, the Administration shall require the provision of an additional quantity of carbon dioxide.

(iv) When carbon dioxide is used as an extinguishing medium both for cargo spaces and for machinery spaces of Category A the quantity of gas need not be more than the maximum required either for the largest cargo compartment or machinery space.

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- (v) For the purpose of this paragraph the volume of carbon dioxide shall be calculated at 0.56 cubic metres to the kilogramme (9 cubic feet to the pound).
 - (vi) When carbon dioxide is used as the extinguishing medium for machinery spaces of Category A the fixed piping system shall be such that 85 per cent of the gas can be discharged into the space within 2 minutes.
 - (vii) Carbon dioxide bottle storage rooms shall be situated at a safe and readily accessible position and shall be effectively ventilated to the satisfaction of the Administration. Any entrance to such storage rooms shall preferably be from the open deck, and in any case shall be independent of the protected space. Access doors shall be gas tight and bulkheads and decks which form the boundaries of such rooms shall be gas tight and adequately insulated.
- (e) (i) 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 elements and any solid combustible elements have been reduced to a permissible minimum.
- (ii) Where such gas is used as the extinguishing medium in a fixed fire extinguishing system for the protection of machinery spaces of Category A it shall afford protection equivalent to that provided by a fixed carbon dioxide system.

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- (iii) Where such gas is used as the extinguishing medium in a fixed fire extinguishing system for the protection of cargo spaces a sufficient quantity of such gas shall be available to supply 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.
- (f) Means shall be provided for automatically giving audible warning of the release of fire extinguishing gas into any space to which personnel normally have access. The alarm shall operate for a suitable period before the gas is released.
- (g) The means of control of any such fixed gas fire extinguishing system shall be readily accessible and simple to operate and shall be grouped together in as few locations as possible at positions not likely to be cut off by a fire in the protected space.

Regulation 117

Fixed Froth Fire Extinguishing System

- (a) A fixed froth fire extinguishing system shall be capable of discharging through fixed discharge outlets in not more than five minutes, a quantity of froth sufficient to cover to a depth of 15 centimetres (6 inches) the largest single area over which oil fuel is liable to spread. The system shall be capable of generating froth suitable for extinguishing oil fires. Means shall be provided for effective distribution of the froth through a permanent system of piping and control valves or cocks to suitable discharge outlets, and for the froth to be effectively directed by fixed sprayers on other main fire hazards in the protected space. The expansion ratio of the froth shall not exceed 12 to 1.

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

Regulation 118

Fixed High Expansion Froth Fire Extinguishing System

- (a) (i) A fixed high expansion froth system shall be capable of rapidly discharging through fixed discharge outlets a quantity of froth sufficient to fill the greatest space to be protected at a rate of at least 1 metre (3.3 feet) depth per minute. The quantity of froth-forming liquid available shall be sufficient to produce a volume of froth equal to five times the volume of the largest space to be protected. The expansion ratio of the froth shall not exceed 1,000 to 1.
- (ii) The Administration may permit alternative arrangements and discharge rates provided that it is satisfied that equivalent protection is achieved.
- (b) Supply ducts for delivering froth, air intakes to the froth generator and the number of froth-producing units shall in the opinion of the Administration be such as will provide effective froth production and distribution.
- (c) The arrangement of the froth generator delivery ducting shall be such that a fire in the protected space will not affect the froth generating equipment.

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- (d) The froth generator, its sources of power supply, froth-forming liquid and means of controlling the system shall be readily accessible and simple to operate and shall be grouped in as few locations as possible at positions not likely to be cut off by fire in the protected space.

Regulation 119

Fixed Pressure Water-spraying
Fire Extinguishing System

- (a) A fixed pressure water-spraying fire extinguishing system provided for protection of machinery spaces of Category A shall be provided with spraying nozzles of an approved type.
- (b) The number and arrangement of the nozzles shall be to the satisfaction of the Administration and be such as to ensure an effective average distribution of water of at least 5 litres per square metre (0.1 gallon per square foot) per minute in the spaces to be protected. Where increased application rates are considered necessary, these shall be to the satisfaction of the Administration. Nozzles shall be fitted above bilges, tank tops and other areas over which oil fuel is liable to spread and also above other specific fire hazards in the machinery spaces of Category A.
- (c) The system may be divided into sections, the distribution valves of which shall be operated from easily accessible positions outside the spaces to be protected and which will not be readily cut off by an outbreak of fire.
- (d) The system shall be kept charged at the necessary pressure and the pump supplying the water for the system shall be put automatically into action by a pressure drop in the system.

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- (e) The pump shall be capable of simultaneously supplying at the necessary pressure all sections of the 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.
- (f) 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 provisions of Regulation 25 of this Chapter that generator shall be arranged to start automatically in case of main power failure so that power for the pump required by paragraph (e) of this Regulation 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.
- (g) Precautions shall be taken to prevent the nozzles from becoming clogged by impurities in the water or corrosion of piping, nozzles, valves and pump.

Regulation 120

Automatic Sprinkler and Fire Alarm and
Fire Detection System

Where an automatic sprinkler and fire alarm and fire detection system is provided in compliance with the provisions of Regulation 107 of this Chapter, it shall be to the satisfaction of the Administration and shall comply with the following requirements:

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(e) General

- (i) It shall be capable of immediate operation at all times and no action by the crew shall be necessary to set it in operation. It shall be of the wet pipe type but small exposed sections may be of the dry pipe type where in the opinion of the Administration this is a necessary precaution. Any parts of the system which may be subjected to freezing temperatures in service shall be suitably protected against freezing. It shall be kept charged at the necessary pressure and shall have provision for a continuous supply of water as required by this Regulation.
- (ii) 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 centralized 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.

(b) Sprinkler Arrangements

- (i) Sprinklers shall be grouped into separate sections, each of which shall contain not more than 200 sprinklers. Any section of sprinklers shall not

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serve more than two decks and shall not be situated in more than one main vertical zone, except that an Administration may, if it is satisfied that the protection of the ship against fire will not thereby be reduced, permit such a section of sprinklers to serve more than two decks or to be situated in more than one main vertical zone.

- (ii) Each section of sprinklers shall be capable of being isolated by one stop valve only. The stop valve in each section shall be readily accessible and its location shall be clearly and permanently indicated. Means shall be provided to prevent the operation of the stop valves by any unauthorized person.
- (iii) A gauge indicating the pressure in the system shall be provided at each section stop valve and at a central station.
- (iv) The sprinklers shall be resistant to corrosion by marine atmospheres. In accommodation and service spaces the sprinklers shall come into operation within the temperature range of 68°C (155°F) and 79°C (175°F), except that in locations such as drying rooms, where high ambient temperatures might be expected, the operating temperature may be increased to not more than 30°C (54°F) above the maximum deck head temperature.
- (v) A list or plan shall be displayed at each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.

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(c) Positioning of Sprinklers

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 (0.1 gallon per square foot per minute) over the nominal area covered by the sprinklers. Alternatively, the Administration may permit the use of sprinklers providing such other amount of water suitably distributed as has been shown to the satisfaction of the Administration to be not less effective.

(d) Pressure Tank

(i) A pressure tank having a volume equal to at least twice that of the charge of water specified in this sub-paragraph shall be provided. The tank shall contain a standing charge of fresh water equivalent to the amount of water which would be discharged in one minute by the pump referred to in sub-paragraph (e)(ii) of this Regulation, and 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. Suitable means of replenishing the air under pressure and of replenishing the fresh water charge in the tank shall be provided. A glass gauge shall be provided to indicate the correct level of the water in the tank.

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

(e) Pump

- (i) An independent power pump shall be provided solely for the purpose of continuing automatically the discharge of water from the sprinklers. The pump shall be brought into action automatically by the pressure drop in the system before the standing fresh water charge in the pressure tank is completely exhausted.
- (ii) 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 (3,000 square feet) at the application rate specified in paragraph (c) of this Regulation.
- (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 subparagraph (d)(i) of this Regulation.
- (iv) The sea inlet to the pump shall wherever possible be in the space containing the pump and 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.

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(f) Location of Sprinkler Pump and Tank

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.

(g) Power Supply

There shall be not less than two sources of power supply for the sea water pump and automatic alarm and detection system. Where the sources of power for the pump are electrical, these shall be a main generator and an emergency source of power. 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 change-over 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 switchboard and the emergency switchboard 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 (f) of this Regulation, be so situated that a fire in any protected space will not affect the air supply to the machinery.

(h) External Connections

The sprinkler system shall have a connection from the ship's fire main by way of a lockable screw-down non-return valve at the connection which will prevent a backflow from the sprinkler system to the fire main.

(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 stop 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) Switches shall be provided at one of the indicating positions referred to in sub-paragraph (a)(ii) of this Regulation which will enable the alarm and the indicators for each section of sprinklers to be tested.

(j) Provision of Spare Sprinkler Heads

Spare sprinkler heads shall be provided for each section of sprinklers to the satisfaction of the Administration.

Regulation 121

Automatic Fire Alarm and Fire Detection System

Where an automatic fire alarm and fire detection system is provided in compliance with the provisions of Regulation 107 of this Chapter, it shall be to the satisfaction of the Administration and shall comply with the following requirements:

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(a) General

(i) It shall be capable of immediate operation at all times and no action of the crew shall be necessary to set it in operation.

(ii) Each section of detectors shall include means for giving a visual and audible alarm signal 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 and shall be centralized 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.

(b) Detector Arrangements

Detectors shall be grouped into separate sections each covering not more than 50 rooms served by such a system and containing not more than 100 detectors. A section of detectors shall not serve spaces on both the port and starboard sides of the ship nor on more than one deck and neither shall it be situated in more than one main vertical zone except that the Administration may if it is satisfied that the protection of the ship against fire will not thereby be reduced, permit such a section of detectors to serve both the port and starboard sides of the ship and more than one deck.

(c) Type of System

The system shall be operated by an abnormal air temperature, by an abnormal concentration of smoke or by

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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 (135°F) and shall operate at a temperature not greater than 74°C (165°F) when the temperature increase to those levels is not more than 1°C (1.8°F) per minute. At the discretion of the Administration the permissible temperature of operation may be increased to 30°C (54°F) above the maximum deckhead temperature in drying rooms and similar places of a normally high ambient temperature. Systems which are sensitive to smoke concentration shall operate on the reduction of the intensity of a transmitted light beam by an amount to be determined by the Administration. Other equally effective methods of operation may be accepted at the discretion of the Administration. The detection system shall not be used for any purpose other than fire detection.

(d) Operation of Detectors

The detectors may be arranged to operate the alarm by the opening or closing of contacts or by other appropriate methods. 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 atmosphere. 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 sensitive element. Detectors operated by the closing of contacts shall be of the sealed contact type and the circuit shall be continuously monitored to indicate fault conditions.

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(e) Detector Grouping

At least one detector shall be installed in each space where detection facilities are required and there shall be not less than one detector for each 37 square metres (400 square feet) of deck area. In large spaces the detectors shall be arranged in a regular pattern so that no detector is more than 9 metres (30 feet) from another detector or more than 4.5 metres (15 feet) from a bulkhead.

(f) Power Supply

There shall be not less than two sources of power supply for the electrical equipment used in the operation of the fire alarm and fire detection 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 changeover switch situated in the control station for the fire detection system. The wiring system 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 in such spaces or to reach the appropriate switchboard.

(g) Provision for Testing, etc.

- (i) A list or plan shall be displayed adjacent to each indicating unit showing the spaces covered and the location of the zone in respect of each section. Suitable instructions for testing and maintenance shall be available.
- (ii) Provision shall be made for testing the correct operation of the detectors and the indicating units by supplying means for applying hot air or smoke at detector positions.

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(h) Provision of Spare Detector Heads

Spare detector heads shall be provided for each section of detectors to the satisfaction of the Administration.

Regulation 122

Fire Control Plans

There shall be permanently exhibited for the guidance of the ship's officers general arrangement plans showing clearly for each deck the control stations, the various fire sections enclosed by "A" Class divisions, the sections enclosed by "B" Class divisions (if any), together with particulars of the fire alarms, detecting systems, the sprinkler installation (if any), the fire extinguishing appliances, means of access to different compartments, decks, etc., and the ventilating system including particulars of the fan control positions, the positions of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy at all times shall be available on board in an accessible position. Plans and booklets shall be kept up-to-date, any alterations being recorded thereon as soon as practicable. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position.

Regulation 123

Acceptance of Substitutes

Where in this Part of this Chapter any special type of appliance, apparatus, extinguishing medium or arrangement is specified, any other type of appliance, etc., may be allowed, provided the Administration is satisfied that it is not less effective.

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ANNEX IV

Regulation 64(a)(ii)

An approved fire alarm or fire detecting system shall be provided which will automatically indicate at one or more suitable points or stations the presence or indication of fire and its location in any part of the ship which, in the opinion of the Administration, is not accessible to the patrol system, except where it is shown to the satisfaction of the Administration that the ship is engaged on voyages of such short duration that it would be unreasonable to apply this requirement.

Regulation 64(a)(iii)

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

Regulation 64(j)

Fireman's Outfits and Personal Equipment:

- (i) The minimum number of fireman's outfits complying with the requirements of Regulation 63 of this Chapter, and of additional sets of personal equipment, each such set comprising the items stipulated in sub-paragraphs (a)(i), (ii) and (iii) of that Regulation, to be carried in all passenger ships, shall be as follows:

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- (1) two fireman's outfits; and in addition
 - (2) for every 262 feet (or 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, two fireman's outfits and two sets of personal equipment, each such set comprising the items stipulated in sub-paragraphs (a)(i), (ii) and (iii) of Regulation 63 of this Chapter.
- (ii) For each fireman's outfit which includes a self-contained breathing apparatus as provided in Regulation 63(b) of this Chapter, spare charges shall be carried on a scale approved by the Administration.
- (iii) Fireman's outfits and sets of personal equipment shall be stored in widely separated positions ready for use. At least two fireman's outfits and one set of personal equipment shall be available at any one position.

Regulation 70

Fire Control Plans

There shall be permanently exhibited in all ships for the guidance of the ship's officers general arrangement plans showing clearly for each deck the control stations, the various fire sections enclosed by fire-resisting bulkheads, the sections enclosed by fire-retarding bulkheads (if any), together with particulars of the fire alarms, detecting systems, the sprinkler installation (if any), the fire extinguishing appliances, means of access to different compartments, decks, etc., and the ventilating system including particulars of the master fan

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controls, the positions of dampers and identification numbers of the ventilating fans serving each section. Alternatively, at the discretion of the Administration, the aforementioned details may be set out in a booklet, a copy of which shall be supplied to each officer, and one copy at all times shall be available on board in an accessible position. Plans and booklets shall be kept up-to-date, any alterations being recorded thereon as soon as practicable. In addition, instructions concerning the maintenance and operation of all the equipment and installations on board for the fighting and containment of fire shall be kept under one cover, readily available in an accessible position.

Regulation 25

Muster List and Emergency Procedure

- (a) Special duties to be undertaken in the event of an emergency shall be allotted to each member of the crew.
- (b) The muster list shall show all the special duties and shall indicate, in particular, the station to which each member must go, and the duties that he has to perform.
- (c) The muster list for each passenger ship shall be in a form approved by the Administration.
- (d) Before the vessel sails, the muster list shall be completed. Copies shall be posted in several parts of the ship, and in particular in the crew's quarters.
- (e) The muster list shall show the duties assigned to the different members of the crew in connection with:

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- (i) the closing of the watertight doors, valves and closing mechanisms of scuppers, ash-shoots and fire doors;
 - (ii) the equipping of the lifeboats (including the portable radio apparatus for survival craft) and the other life-saving appliances;
 - (iii) the launching of the lifeboats;
 - (iv) the general preparation of the other life-saving appliances;
 - (v) the muster of the passengers; and
 - (vi) the extinction of fire, having regard to the ship's fire control plans.
- (f) The muster list shall show the several duties assigned to the members of the stewards' department in relation to the passengers in case of emergency. These duties shall include:
- (i) warning the passengers;
 - (ii) seeing that they are suitably clad and have put on their lifejackets in a proper manner;
 - (iii) assembling the passengers at muster stations;
 - (iv) keeping order in the passages and on the stairways, and, generally, controlling the movements of the passengers; and
 - (v) ensuring that a supply of blankets is taken to the lifeboats.
- (g) The duties shown by the muster list in relation to the extinction of fire pursuant to sub-paragraph (e)(vi) of this Regulation shall include particulars of:
- (i) the manning of the fire parties assigned to deal with fires;

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(ii) the special duties assigned in respect of the operation of fire-fighting equipment and installations.

(h) The muster list shall specify definite signals for calling all the crew to their boat, liferaft and fire stations, and shall give full particulars of these signals. These signals shall be made on the whistle or siren and, except on passenger ships on short international voyages and on cargo ships of less than 150 feet (or 45.7 metres) in length, they shall be supplemented by other signals which shall be electrically operated. All these signals shall be operable from the bridge.

Regulation 26(a)(iv)

The date upon which musters are held, and details of any training and drills in fire-fighting which are carried out on board shall be recorded in such log book as may be prescribed by the Administration; and, if in any week (for passenger ships) or month (cargo ships) no muster or a part muster only is held, an entry shall be made stating the circumstances and extent of the muster held. A report of the examination of the boat's equipment on cargo ships shall be entered in the log book, which shall also record the occasions on which the lifeboats are swung out and lowered in compliance with paragraph (c) of this Regulation.

ANNEX V

Regulation 35(a)

(i) Every cargo ship, except ships employed as whale factory ships, fish processing or canning factory ships, and ships engaged in the carriage of persons employed in the whaling, fish processing or canning industries, shall carry lifeboats on each side of the ship of such aggregate capacity as will accommodate all persons on board, and in addition shall carry liferafts sufficient to accommodate half that number.

Provided that, in the case of such cargo ships engaged on international voyages between near neighbouring countries, the Administration, if it is satisfied that the conditions of the voyage are such as to render the compulsory carriage of liferafts unreasonable or unnecessary, may to that extent exempt individual ships or classes of ships from this requirement.

(ii)(1) Subject to the provisions of sub-paragraph (2), every tanker of 3,000 tons gross tonnage and upwards shall carry not less than four lifeboats, two of which shall be carried aft and two amidships, except that in tankers which have no amidships superstructure all lifeboats shall be carried aft.

(2) A tanker of 3,000 tons gross tonnage and upwards which has no amidships superstructure may be permitted by the Administration to carry two lifeboats only, provided that:

(aa) one lifeboat is carried aft on each side of the ship;

(bb) each such lifeboat shall not exceed 28 feet (or 8.5 metres) in length;

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- (cc) each such lifeboat shall be stowed as far forward as practicable, but at least so far forward that the after end of the lifeboat is one-and-a-half times the length of the lifeboat forward of the propeller; and
- (dd) each such lifeboat shall be stowed as near sea-level as is safe and practicable.

Regulation 35(c)

Every cargo ship with no amidships superstructure having a registered length of 492 feet (or 150 metres) and upwards shall carry, in addition to the liferafts required under paragraph (a)(i) of this Regulation, a liferaft capable of accommodating at least six persons which shall be stowed as far forward as is reasonable and practicable.

ANNEX VI

Regulation 2(g)

"Radiotelephone station", "Radiotelephone installation" and "Watches - radiotelephone" shall be considered as relating to the Medium Frequency Band, unless expressly provided otherwise.

Regulation 7 bis

Watches - VHF Radiotelephone

Each ship provided with a VHF radiotelephone station, in accordance with Regulation 18 of Chapter V, shall maintain a listening watch on the bridge for such periods and on such channels as may be required by the Contracting Government referred to in that Regulation.

Regulation 15 bis

VHF Radiotelephone Stations

- (a) When a Very High Frequency radiotelephone station is provided in accordance with Regulation 18 of Chapter V, it shall be in the upper part of the ship and include a VHF radiotelephone installation complying with the

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provisions of this Regulation and comprising a transmitter and receiver, a source of power capable of actuating them at their rated power levels, and an antenna suitable for efficient radiating and receiving signals at the operating frequencies.

- (b) Such a VHF installation shall conform to the requirements laid down in the Radio Regulations for equipment used in the VHF International Maritime Mobile Radiotelephone Service and shall be capable of operation on those channels specified by the Radio Regulations and as may be required by the Contracting Government referred to in Regulation 18 of Chapter V.
- (c) The Contracting Government shall not require the transmitter R.F. carrier power output to be greater than 10 watts.

The antenna shall, in so far as is practicable, have an unobstructed view in all directions.*

- (d) Control of the VHF channels required for navigational safety shall be immediately available on the bridge convenient to the conning position and, where necessary, facilities should also be available to permit radio-communications from the wings of the bridge.

* For guidance purposes, it is assumed that each ship would be fitted with a vertically polarized unity gain antenna at a nominal height of 30 feet (9.15 metres) above water, a transmitter R.F. power output of 10 watts, and a receiver sensitivity of 2 microvolts across the input terminals for 20 db signal-to-noise ratio.

Regulation 18

VHF Radiotelephone Stations

When a Contracting Government requires ships navigating in an area under its sovereignty to be provided with a Very High Frequency radiotelephone station to be used in conjunction with a system which it has established in order to promote safety of navigation, such station shall comply with the provisions of Regulation 15 bis of Chapter IV and shall be operated in accordance with Regulation 7 bis of Chapter IV.

RESOLUTION A.122(V) adopted on 25 October 1967
AMENDMENTS TO THE INTERNATIONAL
FOR THE SAFETY OF LIFE AT SEA, 1960