

RESOLUTION A.372(X)

*Adopted on 14 November 1977
Agenda item 8(b)*

**RECOMMENDATION CONCERNING FIRE SAFETY REQUIREMENTS
FOR PASSENGER SHIPS CARRYING NOT MORE
THAN 36 PASSENGERS**

THE ASSEMBLY,

NOTING Article 16(i) of the Convention on the Inter-Governmental Maritime Consultative Organization concerning the functions of the Assembly,

NOTING FURTHER Resolution 1 item 3 of the International Conference on Safety of Life at Sea, 1974, which calls for further improvements of fire safety requirements of ships, *inter alia* passenger ships carrying not more than 36 passengers,

HAVING CONSIDERED the Recommendation of the Maritime Safety Committee at its thirty-sixth session,

ADOPTS the Recommendation concerning Fire Safety Requirements for Passenger Ships Carrying not more than 36 Passengers, the text of which is shown at Annex to this Resolution,

RECOMMENDS governments to apply the improved fire safety requirements for passenger ships carrying not more than 36 passengers in addition to :

- (a) the applicable requirements of Chapter II of the International Convention for the Safety of Life at Sea, 1960 ; or
- (b) the applicable requirements of Chapter II-2 of the International Convention for the Safety of Life at Sea, 1974, when that Convention comes into force,

INVITES all governments concerned :

- (a) to make known the provisions of the fire safety requirements for passenger ships carrying not more than 36 passengers to shipowners and operators under their jurisdiction ;
- (b) to make every effort to ensure that these requirements apply uniformly to all new passenger ships carrying not more than 36 passengers as soon as possible ;
- (c) to inform the Organization of measures taken by them in this respect.

REQUESTS the Maritime Safety Committee to continue work on this subject with a view to improving the requirements and, at the appropriate time, to redraft the requirements for insertion into Chapter II-2 of the International Convention for the Safety of Life at Sea, 1974, with a view to their adoption as amendments to that Convention after its entry into force.

ANNEX

RECOMMENDATION CONCERNING FIRE SAFETY REQUIREMENTS FOR PASSENGER SHIPS CARRYING NOT MORE THAN 36 PASSENGERS

Specific terms in these Requirements have the meaning as defined in Regulation 3 of Chapter II-2 of the International Convention for the Safety of Life at Sea, 1974. Wherever the term "Convention" appears in these Requirements it means the International Convention for the Safety of Life at Sea, 1974.

Regulation 1

Structure

(a) 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 3(g) of Chapter II-2 of the Convention the "applicable fire exposure" shall be according to the integrity and insulation standards given in the tables of Regulation 4 of these Requirements. An example where divisions such as decks or sides and ends of deckhouses are permitted to have "B-O" fire integrity, the "applicable fire exposure" shall be one half-hour.

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

- (i) 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 degrees Celsius above the ambient temperature at any time during the applicable fire exposure to the standard fire test.
- (ii) 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 :
 - (1) that for such members supporting lifeboat and liferaft areas and "A" Class divisions, the temperature rise limitation specified in sub-paragraph (i) of this paragraph shall apply at the end of one hour ; and
 - (2) that for such members required to support "B" Class divisions, the temperature rise limitation specified in sub-paragraph (i) of this paragraph shall apply at the end of one half-hour.
- (iii) 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 2

Main Vertical Zones

(a) The hull, superstructure and deckhouses in the way of accommodation and service spaces shall be subdivided into main vertical zones by "A" Class divisions. These divisions shall have insulation values in accordance with tables in Regulation 4 of these Requirements.

(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.

(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 2 of Regulation 4 of these Requirements.

Regulation 3

Internal Bulkheads

(a) All bulkheads within accommodation and service spaces which are not required to be "A" Class divisions shall be at least "B" Class or "C" Class divisions as prescribed in the tables in Regulation 4 of these Requirements. All such divisions may be faced with combustible materials in accordance with the provisions of Regulation 10 of these Requirements.

(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 12 of Chapter II-2 of the Convention, 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 4 of these Requirements, 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 non-combustible materials and shall be constructed and erected so as to provide substantial fire resistance to the satisfaction of the Administration.

(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 4

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 these Requirements, the minimum fire integrity of bulkheads and decks shall be as prescribed in Table 1 and Table 2 of this Regulation.

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

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

- (ii) For determining the appropriate fire integrity standards to be applied to divisions between adjacent spaces, such spaces are classified according to their fire risk as shown in Categories (1) to (11) below. The title of each category is intended to be typical rather than restrictive. The number in parenthesis preceding each category refers to the applicable column or row 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-extinguishing rooms, fire control stations and fire-recording stations.
 Control room for propelling machinery when located outside the machinery space.
 Spaces containing centralized fire alarm equipment.

(2) *Corridors*

Corridors and lobbies.

(3) *Accommodation Spaces*

Public spaces such as halls, dining rooms, lounges and similar permanently enclosed spaces.
 Lavatories, cabins, offices, hospitals, cinemas, games and hobbies rooms.
 Pantries containing no cooking appliances and similar spaces.

(4) *Stairways*

Interior stairways, lifts and escalators (other than those wholly contained within the machinery spaces) and enclosures thereto.
 In this connexion, a stairway which is enclosed only at one level shall be regarded as part of the space from which it is not separated by a fire door.

(5) *Service Spaces (Low Risk)*

Lockers and store-rooms having areas of less than 2 square metres, drying rooms and laundries.

(6) *Machinery Spaces of Category A*

Spaces as defined in Regulation 3(o) of Chapter II-2 of the Convention.

(7) *Other Machinery Spaces*

Spaces as defined in Regulation 3(p) of Chapter II-2 of the Convention excluding machinery spaces of Category A.

(8) *Cargo Spaces*

All spaces used for cargo (including cargo oil tanks) and trunkways and hatchways to such spaces, other than special category spaces.

(9) *Service Spaces (High Risk)*

Galleys, pantries containing cooking appliances, paint and lamp rooms, lockers and store-rooms having areas of 2 square metres or more, workshops other than those forming part of the machinery spaces.

(10) *Open Decks*

Open deck spaces and enclosed promenades containing no fire risk. Air spaces (the space outside superstructures and deckhouses).

(11) *Special Category Spaces*

All 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.

- (iii) 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 12 of Chapter II-2 of the Convention or between such zones neither of which is so protected, the higher of the two values given in the tables shall apply.
- (iv) 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 12 of Chapter II-2 of the Convention 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.

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

(d) External boundaries which are required in paragraph (a) of Regulation 1 of these Requirements to be of steel or equivalent material may be pierced for the fitting of windows and sidescuttles provided that there is no requirement for such boundaries to have "A" Class integrity elsewhere in these Requirements. Similarly, in such boundaries which are not required to have "A" Class integrity, doors may be of materials to the satisfaction of the Administration.

TABLE 1 – FIRE INTEGRITY OF BULKHEADS SEPARATING ADJACENT SPACES

| Spaces | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|------------------------------------|------------------|----------------|------------------|--------------------------------------|--------------------------------------|------|------------------|------|--------------------------|------|--------------------------|
| Control Stations (1) | A-0 ^c | A-0 | A-60 | A-0 | A-15 | A-60 | A-15 | A-60 | A-60 | * | A-60 |
| Corridors (2) | | C ^e | B-0 ^e | B-0 ^e A-0 ^a | B-0 ^e | A-60 | A-0 | A-0 | A-15 A-0 ^d | * | A-15 |
| Accommodation Spaces (3) | | | C ^e | B-0 ^e A-0 ^a | B-0 ^e | A-60 | A-0 | A-0 | A-15 A-0 ^d | * | A-30 A-0 ^d |
| Stairways (4) | | | | B-0 ^e A-0 ^a | B-0 ^e A-0 ^a | A-60 | A-0 | A-0 | A-15 A-0 ^d | * | A-15 |
| Service Spaces (Low Risk) (5) | | | | | C ^e | A-60 | A-0 | A-0 | A-0 | * | A-0 |
| Machinery Spaces of Category A (6) | | | | | | * | A-0 | A-0 | A-60 | * | A-60 |
| Other Machinery Spaces (7) | | | | | | | A-0 ^b | A-0 | A-0 | * | A-0 |
| Cargo Spaces (8) | | | | | | | | * | A-0 | * | A-0 |
| Service Spaces (High Risk) (9) | | | | | | | | | A-0 ^b | * | A-30 |
| Open Decks (10) | | | | | | | | | | – | A-0 |
| Special Category Spaces (11) | | | | | | | | | | | A-0 |

TABLE 2 – FIRE INTEGRITY OF DECKS SEPARATING ADJACENT SPACES

| Space Below ↓ | Space Above → | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|--------------------------------|---------------|------|--------------------------|--------------------------|--------------------------|------|------|------|------|------|------|--------------------------|
| Control Stations | (1) | A-0 | A-0 | A-0 | A-0 | A-0 | A-60 | A-0 | A-0 | A-0 | * | A-30 |
| Corridors | (2) | A-0 | * | * | A-0 | * | A-60 | A-0 | A-0 | A-0 | * | A-0 |
| Accommodation Spaces | (3) | A-60 | A-0 | * | A-0 | * | A-60 | A-0 | A-0 | A-0 | * | A-30 A-0 ^d |
| Stairways | (4) | A-0 | A-0 | A-0 | * | A-0 | A-60 | A-0 | A-0 | A-0 | * | A-0 |
| Service Spaces (Low Risk) | (5) | A-15 | A-0 | A-0 | A-0 | * | A-60 | A-0 | A-0 | A-0 | * | A-0 |
| Machinery Spaces of Category A | (6) | A-60 | A-60 | A-60 | A-60 | A-60 | * | A-60 | A-30 | A-60 | * | A-60 |
| Other Machinery Spaces | (7) | A-15 | A-0 | A-0 | A-0 | A-0 | A-0 | * | A-0 | A-0 | * | A-0 |
| Cargo Spaces | (8) | A-60 | A-0 | A-0 | A-0 | A-0 | A-0 | A-0 | * | A-0 | * | A-0 |
| Service Spaces (High Risk) | (9) | A-60 | A-30 A-0 ^d | A-30 A-0 ^d | A-30 A-0 ^d | A-0 | A-0 | A-0 | A-0 | A-0 | * | A-30 |
| Open Decks | (10) | * | * | * | * | * | * | * | * | * | – | A-0 |
| Special Category Spaces | (11) | A-60 | A-15 | A-30 A-0 ^d | A-15 | A-0 | A-30 | A-0 | A-0 | A-30 | A-0 | A-0 |

Notes: To be applied to both Tables 1 and 2, as appropriate.

- ^a For clarification as to which applies see Regulations 3 and 6 of these Requirements.
- ^b Where spaces are of the same numerical category and superscript b appears, a bulkhead or deck of the ratings shown in the tables is only required when the adjacent spaces are for a different purpose, e.g. in category (9). A galley next to a galley does not require a bulkhead but a galley next to a paint room requires an "A-0" bulkhead.
- ^c Bulkheads separating the wheelhouse and chartroom from each other may be "B-0" rating.
- ^d See Regulation 4(b)(iii) and (iv) of these Requirements.
- ^e For the application of Regulation 2(a) of these Requirements "B-0" and "C", where appearing in Table 1, shall be read as "A-0".
- ^f Where an asterisk appears in the tables, the division is required to be of steel or equivalent material but is not required to be of "A" Class standard.
For the application of Regulation 2(a) of these Requirements an asterisk, where appearing in Table 2, except for categories (8) and (10), shall be read as "A-0".

Regulation 5

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) If a radiotelegraph station has no direct access to the open deck, two means of escape from or access to such station shall be provided, one of which may be a porthole or window of sufficient size or another means to the satisfaction of the Administration.
 - (iv) No dead-end corridors having a length of more than 7 metres shall be accepted. A dead-end corridor is a corridor or part of a corridor from which there is only one route of escape.
 - (v) At least one of the means of escape required by sub-paragraphs (i) and (ii) of this paragraph shall be by means of a readily accessible enclosed stairway, which shall provide continuous fire shelter from the level of its origin to the appropriate lifeboat and liferaft embarkation decks or the highest level served by the stairway, whichever level is the highest. However, where the Administration has granted dispensation under the provisions of sub-paragraph (i) of this paragraph, 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.
 - (vi) Protection of access from the stairway enclosures to the lifeboat and liferaft embarkation areas shall be to the satisfaction of the Administration.
 - (vii) Lifts shall not be considered as forming one of the required means of escape.
 - (viii) Stairways serving only a space and a balcony in that space shall not be considered as forming one of the required means of escape.
- (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), (v), (vi) and (vii) of this Regulation.
- (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) (i) Two means of escape shall be provided from each machinery space. In particular, the following provisions shall be complied with :
- (1) Where the space is below the bulkhead deck the two means of escape shall consist of either :
 - (a) two sets of steel ladders as widely separated as possible, leading to doors in the upper part of the space similarly separated and from which access is provided to the appropriate lifeboat and liferaft embarkation decks. One of these ladders shall provide continuous fire shelter from the lower part of the space to a safe position outside the space ; or
 - (b) one steel ladder leading to a door in the upper part of the space from which access is provided to the embarkation deck and a steel door capable of being operated from each side and which provides a safe escape route to the embarkation deck.
 - (2) 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.
- (ii) Provided that in a ship of less than 1,000 tons gross tonnage, the Administration may dispense with one of the means of escape, due regard being paid to the width and disposition of the upper part of the space ; and 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 6

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 4 of these Requirements ;
 - (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 the control of draught and smoke.

Regulation 7

Openings in "A" and "B" Class Divisions

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.

(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 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 3½ 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 12 of Chapter II-2 of the Convention 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.

Openings in "B" Class Divisions

(i) 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 ensure that the fire resistance is not impaired.

(j) 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 metre. When such opening is cut in a door it shall be fitted with a grill made of non-combustible material. Doors shall be non-combustible.

(k) 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. Administrations may permit the use of combustible materials in doors separating cabins from the individual interior sanitary spaces such as showers.

(l) Where an automatic sprinkler system complying with the provisions of Regulation 12 of Chapter II-2 of the Convention is fitted :

- (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 3 of these Requirements.

Regulation 8

Ventilation Systems

- (a) (i) Ventilation ducts shall be of non-combustible material. Short ducts, however, not generally exceeding 2 metres in length and with a cross-section not exceeding 0.02 square metre need not be non-combustible, subject to the following conditions :
 - (1) These ducts shall be of a material which, in the opinion of the Administration, has a low fire risk.
 - (2) They may only be used at the end of the ventilation device.
 - (3) They shall not be situated less than 600 millimetres, measured along the duct, from an opening in an "A" or "B" Class division including continuous "B" Class ceilings.
- (ii) Where the ventilation ducts with a free-sectional area exceeding 0.02 square metre pass through Class "A" bulkheads or decks, the opening should be lined with a steel sheet sleeve unless the ducts passing through the bulkheads or decks are of steel in the vicinity of passage through the deck or bulkhead and comply in this part with the following specification :
 - (1) For ducts with a free cross-sectional area exceeding 0.02 square metre, the sleeves shall have a thickness of at least 3 millimetres and a length of 900 millimetres. When passing through bulkheads, this length shall be divided preferably into 450 millimetres on each side of the bulkhead. Ducts with a free cross-sectional

area exceeding 0.02 square metre or sleeves lining ducts with a free cross-sectional area exceeding 0.02 square metre shall be provided with fire insulation. The insulation shall have at least the same fire integrity as the bulkhead or deck through which the duct passes. Equivalent penetration protection may be provided to the satisfaction of the Administration.

- (2) Ducts with a free cross-sectional area exceeding 0.075 square metre shall be fitted with fire dampers in addition to the requirements of sub-paragraph (ii) (1) of this paragraph. The fire damper shall operate automatically but shall also be capable of being closed manually from both sides of the bulkhead or deck. The damper shall be provided with an indicator which shows whether the damper is open or closed. Fire dampers are not required, however, where ducts pass through spaces surrounded by "A" Class divisions, without serving those spaces, provided those ducts have the same fire integrity as the bulkheads which they pierce.
- (iii) (1) Ducts provided for the 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 these ducts shall be of non-combustible material and provided that the insulation requirements of sub-paragraph (2) of this paragraph are also complied with.
 - (2) Ducts for ventilation of machinery spaces of Category A, galleys or car deck spaces, shall be insulated to the same degree as the division where they pass through accommodation spaces, service spaces or control stations. The same shall apply to ducts provided for ventilation of accommodation spaces, service spaces or control stations which pass through machinery spaces of Category A, galleys or car deck spaces.
 - (iv) Where ventilation ducts with a free cross-sectional area exceeding 0.02 square metre pass through "B" Class bulkheads, the openings shall be lined with steel sheet sleeves of 900 millimetres in length, unless the ducts are of steel for this length in way of the bulkhead. When passing through a "B" Class bulkhead this length shall be divided preferably into 450 millimetres on each side of the bulkhead.
 - (v) 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.
 - (vi) 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 :
 - (1) a grease trap readily removable for cleaning ;
 - (2) a fire damper located in the lower end of the duct ;
 - (3) arrangements, operable from within the galley, for shutting off the exhaust fan ;
and
 - (4) fixed means for extinguishing a fire within the duct.

(b) The main inlets and outlets of all ventilation systems shall be capable of being closed from outside the spaces being ventilated. Power ventilation of accommodation spaces, service spaces, control stations and machinery spaces shall be capable of being stopped from an easily accessible position outside the space being served. This position should not be readily cut off in the event of a fire in the spaces served. The means provided for stopping the power ventilation of the machinery spaces shall be entirely separate from the means provided for stopping ventilation of other spaces.

Regulation 9

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 Regulation 7 of these Requirements apply, shall be constructed so as to preserve the integrity requirements of the type of bulkheads in which they are fitted.

(b) Notwithstanding the requirements of the tables in Regulation 4 of these Requirements:

- (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.

Regulation 10

Miscellaneous Items

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 non-combustible materials. Partial bulkheads or decks used to subdivide a space for utility or artistic treatment shall also be of non-combustible 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 non-combustible, 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 millimetres within any such spaces except corridors, stairway enclosures and control stations where it shall not exceed 1.5 millimetres.

(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 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 12 of Chapter II-2 of the Convention, the above volume may include some combustible material used for erection of "C" Class divisions.

(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 non-combustible materials and with solid sides and bottoms.

Requirements Applicable to all Portions of the Ship

(j) (i) In accommodation and service spaces and control stations, pipes penetrating "A" or "B" Class divisions shall be of materials approved by the Administration having regard to the temperature such divisions are required to withstand. Where the Administration may permit the conveying of oil and combustible liquids through accommodation and service spaces, the pipes conveying oil or combustible liquids shall be of a material approved by the Administration having regard to the fire risk.

(ii) Materials readily rendered ineffective by heat shall not be used for overboard scuppers, sanitary discharges, and other outlets which are close to the water-line 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

(k) (i) Air spaces enclosed behind ceilings, panelling or linings, shall be suitably divided by close-fitting draught stops not more than 14 metres apart.

(ii) In the vertical direction, such spaces, including those behind linings of stairways, trunks, etc., shall be closed at each deck.

(l) 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.

Regulation 11

Automatic Sprinkler and Fire Alarm and Fire Detection Systems

In any ship to which these Requirements apply there shall be installed throughout each separate zone, whether vertical or horizontal, in all accommodation and service spaces and,

* Reference is made to Guidelines on the Evaluation of Fire Hazard Properties of Materials, adopted by the Organization by Resolution A.166(ES.IV).

† Reference is made to Improved Provisional Guidelines on Test Procedures for Primary Deck Coverings, adopted by the Organization by Resolution A.214(VII).

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) either :

- (i) an automatic sprinkler and fire alarm and fire detection system of an approved type, complying with the provisions of Regulation 12 of Chapter II-2 of the Convention, 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 13 of Chapter II-2 of the Convention, and installed and so arranged as to detect the presence of fire in such spaces.

Regulation 12

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.
- (ii) All requirements laid down in Regulations 7 and 8 of these Requirements 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 4 of these Requirements and the horizontal boundaries as required for Category (11) spaces in Table 2 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.

* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by Resolution A.123(V).

(d) Patrols and Detection

Special category spaces shall be provided with :

- (i) an automatic fire detection system of an approved type unless an efficient continuous patrol system is maintained ; and
- (ii) manual fire alarms as necessary throughout the spaces, one being 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 7 (d) of Chapter II-2 of the Convention, 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.

(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 Flammable Vapours

- (i) Equipment which may constitute a source of ignition of flammable vapours and in particular electrical equipment and wiring, shall be installed at least 450 millimetres above the deck, provided that if the Administration is satisfied that the installation of such 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 450 millimetres 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 450 millimetres 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 Chapter II-1 of the Convention.

(j) *Precautions against Ignition of Flammable 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 flammable vapours shall not be permitted.
- (ii) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures, and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Regulation 13

Protection of Cargo Spaces other than Special Category Spaces intended for the Carriage of 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 alarm and fire detection system.

(b) *Fire-Extinguishing Arrangements*

- (i) There shall be fitted a fixed gas fire-extinguishing system which shall comply with the provisions of Regulation 8 of Chapter II-2 of the Convention, 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 at least two-thirds of the gas required for the relevant space shall be introduced during 10 minutes. Any other fixed gas fire-extinguishing system or fixed high expansion foam fire-extinguishing system may be fitted provided it gives equivalent protection.

- (ii) As an alternative, a system meeting the requirements of Regulation 30(c) of Chapter II-2 of the Convention shall be fitted, provided that Regulation 30(i) of that Chapter is also complied with.*
- (iii) 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 6 air changes per hour. The system for such cargo spaces shall be entirely separate 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 Flammable 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 flammable vapours shall not be permitted.
- (ii) Electrical equipment and wiring, if installed in an exhaust ventilation duct, shall be of a type approved for use in explosive petrol and air mixtures and the outlet from any exhaust duct shall be sited in a safe position, having regard to other possible sources of ignition.

Regulation 14

Provision for Fire Alarm and Public Address Systems and for Fire-Extinguishing Equipment

(a) *Fire Detection, Alarms and Public Address Systems*

- (i) Manual alarms shall be fitted throughout the accommodation and service spaces to transmit an alarm immediately to the navigating bridge or main fire control station.
- (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 cargo space which, in the opinion of the Administration, is not accessible 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.
- (iii) 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.

* Reference is made to Recommendation on Fixed Fire-Extinguishing Systems for Special Category Spaces, adopted by the Organization by Resolution A.123(V).

- (iv) A special alarm, operated from the navigating bridge or fire control station, shall be fitted to summon the crew. This alarm may be part of the ship's general alarm system but it shall be capable of being sounded independently of the alarm to the passenger spaces.
- (v) A public address system or other effective means of communication shall be available throughout the accommodation and service spaces and control stations.

(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 5 of Chapter II-2 of the Convention 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 connexions, 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 less than 1,000 tons gross tonnage the arrangements shall be to the satisfaction of the Administration.

(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 paragraph (d) of Regulation 5 of Chapter II-2 of the Convention 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 paragraph (d) of Regulation 5 of Chapter II-2 of the Convention 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 paragraph (g) of Regulation 5 of Chapter II-2 of the Convention, nozzles suitable for spraying water on oil, or alternatively dual-purpose nozzles.
- (v) 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 Connexion*

- (i) A ship of 1,000 tons gross tonnage and upwards shall be provided with at least one international shore connexion, complying with the provisions of paragraph (h) of Regulation 5 of Chapter II-2 of the Convention.
- (ii) Facilities shall be available enabling such a connexion 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.

(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 8 of Chapter II-2 of the Convention, or by a fixed high expansion foam 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 11 of Chapter II-2 of the Convention.
 - (2) A gas system complying with the provisions of Regulation 8 of Chapter II-2 of the Convention.
 - (3) A high expansion foam system complying with the provisions of Regulation 10 of Chapter II-2 of the Convention.

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-foam equipment complying with the provisions of paragraph (d) of Regulation 7 of Chapter II-2 of the Convention.
- (iii) There shall be at least two approved portable extinguishers discharging foam 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 foam-type extinguisher of at least 136 litres capacity or equivalent in each boiler room. These extinguishers shall be provided with hoses on reels suitable for reaching any part of the boiler room.

- (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 for main propulsion, or for other purposes when such machinery has in the aggregate a total power output of not less than 373 kilowatt, shall be provided with the following arrangements :

- (i) There shall be one of the fire-extinguishing systems required by sub-paragraph (g) (i) of this Regulation.
- (ii) There shall be at least one set of portable air-foam equipment complying with the provisions of paragraph (d) of Regulation 7 of Chapter II-2 of the Convention.
- (iii) There shall be in each such space approved foam-type fire extinguishers each of at least 45 litres capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the fuel and lubricating oil pressure systems, gearing and other fire hazards. In addition, there shall be provided a sufficient number of portable foam extinguishers or equivalent which shall be so located that an extinguisher is not more than 10 metres 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 for main propulsion or for other purposes when such machinery has in the aggregate a total power output of not less than 373 kilowatt :

- (i) There shall be provided foam fire extinguishers each of at least 45 litres capacity or equivalent sufficient in number to enable foam or its equivalent to be directed on to any part of the 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. 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 foam extinguishers or equivalent which shall be so located that an extinguisher is not more than 10 metres walking distance from any point in the space ; provided that there shall be at least two such extinguishers in each such space, and 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 these Requirements

Where a fixed fire-extinguishing system not required by these Requirements is installed, such a system shall be to the satisfaction of the Administration.

(l) 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 alarm and fire detection 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

- (i) The minimum number of firemen's outfits complying with the requirements of Regulation 14 of Chapter II-2 of the Convention, 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 shall be as follows :
 - (1) two fireman's outfits ; and in addition
 - (2) for every 80 metres or part thereof, of the aggregate of the lengths of all passenger spaces and service spaces on the deck which carries such spaces or, if there is more than one such deck, on the deck which has the largest aggregate of such lengths, 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 14 of Chapter II-2 of the Convention.
- (ii) For each fireman's outfit which includes a self-contained breathing apparatus as provided in paragraph (b) of Regulation 14 of Chapter II-2 of the Convention, 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 15***Arrangements for Oil Fuel, Lubricating Oil and other Flammable 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 60 degrees Celsius (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 degrees Celsius.
Provided that the Administration may permit the general use of fuel oil having a flashpoint of not less than 43 degrees Celsius 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 within 10 degrees Celsius below the flashpoint of the fuel.

- (ii) As far as practicable, no part of the oil fuel system containing heated oil under pressure exceeding 0.18 newton per square millimetre shall be so 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.
- (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 overflowing 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.
- (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 ship 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 Flammable Oils

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

Regulation 16***Special Arrangements in Machinery Spaces***

- (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 3½ 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 ;
- (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) Means shall be provided for stopping ventilating fans serving machinery and cargo spaces and for closing all doorways, ventilators, annular spaces around funnels and other openings to such spaces. These means shall be capable of being operated from outside such spaces in case of fire and comply with the provisions of Regulation 8 of these Requirements.