

## CHAPTER 14 - PART A

### SHIPS OF CLASSES VII, VII(A), VIII, VIII(A), IX AND IX(A) AND TANKERS OTHER THAN THOSE TO WHICH PART VIII OF THE L.S. REGULATIONS APPLY. (L.S. REGULATIONS 69-83).

#### 14.1 Structure (L.S. Regulation 70(1))

##### 14.1.1 Hinged or portable decks

Moveable decks with their constructing ramps should be constructed of steel of equivalent material. Proposals to construct such decks with aluminium should be referred initially to Headquarters for consideration.

##### 14.1.2 False decks

False decks should be constructed of steel or equivalent material. A false deck is any deck which is fitted above the level of a structural deck for any purpose and is sometimes referred to as a false or raised floor (see also paragraph 14.5.8).

#### 14.2 Aluminium Structure (L.S. Regulation 74(2))

##### 14.2.1 Insulating the structure

14.2.1.1 Tables 1 and 2 in Schedule 1 to MSN 1668(M) require all bulkheads and decks to be 'A' Class or 'B' Class divisions except for those bulkheads which are permitted to be 'C' Class divisions and those bulkheads and decks which have an asterisk notation and are consequently permitted by paragraph 1(f)(ii) of Schedule 1 to be of aluminium alloy with no 'A' Class standard.

14.2.1.2 Therefore all aluminium alloy bulkheads and decks except for 'C' Class bulkheads and bulkheads and decks with no 'A' Class standard are required by L.S. Regulation 52(2)(a) to be insulated such that the temperature of their structural core does not rise more than 200°C above the ambient temperature when subjected to a standard fire test of 60 minutes and 30 minutes duration in the case of 'A' Class division and 'B' Class division respectively. See also paragraphs 11.2.1.4 and 11.2.2.2.

##### 14.2.2 Approved insulations

Approved insulations should be used to insulate the aluminium alloy 'A' Class and 'B' Class divisions in accordance with the conditions indicated in the appropriate approval certificates. In the absence of any approvals covering the use of materials as the insulating media for aluminium alloy 'A' Class and 'B' Class divisions of a particular standard then a material which has been approved for a higher standard

for aluminium alloy 'A' Class or 'B' Class divisions should be used. See also paragraphs 11.2.1.4 and 11.2.2.2.

### 14.2.3 Bulkheads and decks not required to be 'A' Class or 'B' Class divisions

14.2.3.1 Any 'C' Class bulkhead or bulkheads and decks constructed of aluminium alloy which are not required to be of 'A' Class standard (see paragraph 1(f)(ii) of Schedule 1 to MSN 1668(M)), and are structural bulkheads or decks supporting 'A' Class or 'B' Class divisions, are required by paragraph 1(a) of Schedule 1 to be insulated such that the temperature of their structural core does not rise more than 200°C above the ambient temperature when subjected to a standard fire test for the same periods of time as required for the divisions which they are supporting.

14.2.3.2 Any structural bulkheads and decks constructed of aluminium alloy which are not required to be of 'A' Class standard (see paragraph 1(f)(ii) of Schedule 1 to MSN 1668(M)) and do not support any 'A' Class or 'B' Class divisions, are still required by L.S. Regulation 70 to be of an 'equivalent material' which, as defined, implies that they should be insulated in order to provide structural and integrity properties equivalent to steel at the end of the appropriate fire test. The regulations do not specify what is an appropriate fire test for such bulkheads and decks as they do for 'A' Class and 'B' Class divisions. Nor do the regulations indicate that the core temperature limitation of 200°C should apply to such bulkheads and decks. Consequently those bulkheads and decks need only be protected by a non-combustible lining or ceiling or, in the absence of a non-combustible lining or ceiling, by a 25mm thickness of approved 'A' Class mineral wool insulation.

### 14.2.4 Structure supporting lifeboats and liferafts (L.S. Regulation 70)

Notwithstanding paragraphs 14.2.1 and 14.2.3, any aluminium alloy structure which supports the lifeboat and liferaft embarkation, stowage, handling and lowering positions is required by L.S. Regulation 70 to be insulated such that the temperature rise limitation of the structural core shall apply for 60 minutes duration. Such structure should be insulated in the same manner as an aluminium alloy 'A' Class division of A-0 standard.

## **14.3 Methods of Fire Protection (L.S. Regulation 72)**

### 14.3.1 Method IC (L.S. Regulation 72(a))

In a ship in which Method IC has been adopted the following applies:

14.3.1.1 all internal bulkheads within accommodation spaces and service spaces other than those required to be 'A' Class or 'B' Class divisions, are required to be 'C' Class divisions; and

14.3.1.2 a sprinkler or fire detection system is not required to be fitted in accommodation spaces and service spaces except that smoke detection and manually operated call points are required to be fitted in corridors, stairway enclosures and escape routes within accommodation spaces.

#### 14.3.2 Method IIC (L.S. Regulation 72(b))

In a ship in which Method IIC has been adopted the following applies:

14.3.2.1 a sprinkler system is required to be fitted in all accommodation spaces and service spaces in which fire may be expected to originate. Sprinklers need not be fitted in either private and communal sanitary accommodation not fitted with electric space heaters or void spaces. Surveyors should note that the regulations do not require sprinklers to be fitted in fire control stations;

14.3.2.2 there is no restriction on the type of internal bulkheads other than those required by the regulations to be 'A' Class, 'B' Class or 'C' Class divisions (i.e. such bulkheads may be combustible or non-combustible with no restrictions on their construction subject to paragraph 14.4.3.3); and

14.3.2.3 smoke detection and manually operated call points are required to be fitted in corridors, stairway enclosures and escape routes within accommodation spaces.

#### 14.3.3 Method IIIC (L.S. Regulation 72(c))

In a ship in which Method IIIC has been adopted the following applies:

14.3.3.1 a fire detection system is required to be fitted in all accommodation spaces and service spaces in which fire may be expected to originate except that smoke detection and manually operated call points are required to be fitted in corridors, stairway enclosures and escape routes within accommodation spaces. Fire detectors need not be fitted in either private and communal sanitary accommodation not fitted with electric space heaters or void spaces. Surveyors should note that the regulations do not require fire detectors to be fitted in control stations; and

14.3.3.2 there is no restriction on the type of internal bulkheads other than those required by the regulations to be 'A' Class, 'B' Class or 'C' Class divisions (i.e. such bulkheads may be combustible or non-combustible with no restrictions on their construction subject to paragraph 14.4.4.3) except that in no case shall the area of any accommodation space or spaces bounded by 'A' Class and/or 'B' Class divisions exceed 50m<sup>2</sup> subject to paragraph 14.4.4.4.

## 14.4 Bulkheads Within Accommodation Spaces, Service Spaces and Control Stations (L.S. Regulation 73)

### 14.4.1 'B' Class divisions (Regulation 73(1))

14.4.1.1 In L.S. Regulation 73(1) the 'other boundaries' to which a 'B' Class bulkhead is required to extend, in addition to the ships side, are:

- (a) a deckhouse side;
- (b) an 'A' Class bulkhead except that the 'B' Class bulkhead should not penetrate the 'A' Class insulation; and
- (c) another 'B' Class bulkhead of the same or higher 'B' Class standard.

14.4.1.2 When continuous 'B' Class ceilings and/or linings are fitted on both sides of a 'B' Class bulkhead, the bulkhead should only terminate at the ceilings or linings if they are of the same or higher 'B' Class standard.

14.4.1.3 This regulation is illustrated in figures 12.4 and 12.5.

### 14.4.2 Bulkheads in ships in which Method IC has been adopted (L.S. Regulation 73(2))

All bulkheads within accommodation spaces, service spaces and control stations in ships in which Method IC has been adopted are required to be 'A' Class, 'B' Class or 'C' Class divisions as indicated in table 1 of Schedule 1 to MSN 1668(M). These divisions should be constructed and insulated as indicated in paragraphs 11.2.1 and 11.4 in the case of 'A' Class divisions, paragraphs 11.2.2 and 11.8 in the case of 'B' Class divisions and paragraph 11.11 in the case of 'C' Class divisions.

### 14.4.3 Bulkheads in ships in which Method IIC has been adopted (L.S. Regulation 73(3))

14.4.3.1 There are no restrictions on the construction of bulkheads within accommodation spaces, service spaces and control stations in ships in which Method IIC has been adopted i.e. the bulkheads may be combustible subject to paragraph 14.4.4.3 or non-combustible with no restrictions on the methods of their erection except where bulkheads are required to be:

- (a) 'A' Class or 'B' Class divisions; or
- (b) 'C' Class divisions as indicated by a letter 'C' with no superscription 'a' in table 1 of Schedule 1 to MSN 1668(M) e.g. a bulkhead separating two service spaces of low fire risk;

14.4.3.2 In no case should a bulkhead which is permitted by the regulations to be combustible penetrate an 'A' Class insulation or a 'B' Class division.

14.4.3.3 Combustible bulkheads should comply with the Merchant Shipping (Crew Accommodation) Regulations 1997 and should not be constructed of organic foams, cork or other highly flammable materials, or other materials capable of producing large quantities of smoke or toxic products, see also paragraph 11.17. This does not apply to wood or wood products and surface finish materials referred to in paragraph 14.11.3.

#### 14.4.4 Bulkheads in ships in which Method IIIC has been adopted (L.S. Regulation 73(4))

14.4.4.1 There are no restrictions on the construction of bulkheads within accommodation spaces, service spaces and control stations in ships in which Method IIIC has been adopted i.e. the bulkheads may be combustible subject to paragraph 14.4.4.3 or non-combustible with no restriction on the methods of their erection except where bulkheads are required to be:

- (a) 'A' Class or 'B' Class divisions; or
- (b) 'C' Class divisions as indicated by a letter 'C' with no superscription 'b' in table 1 of Schedule 1 to MSN 1668(M) e.g. a bulkhead separating two service spaces of low fire risk.

14.4.4.2 In no case should a bulkhead which is permitted by the regulations to be combustible penetrate an 'A' Class insulation or a 'B' Class division.

14.4.4.3 Combustible bulkheads should comply with the Merchant Shipping (Crew Accommodation) Regulations 1997 and should not be constructed of organic foams, cork and other highly flammable materials, or other materials capable of producing large quantities of smoke or toxic products, see also paragraph 11.17. This does not apply to wood products and surface finish materials referred to in paragraph 14.11.3.

14.4.4.4 When a public space is bounded by 'A' Class and 'B' Class divisions or by 'B' Class divisions only the area may be increased to a maximum of 75 square metres. [unified text]

### **14.5 Fire Integrity of Bulkheads and Decks (L.S. Regulation 74)**

#### 14.5.1 Minimum standards and categories

Each space throughout the ship should be allocated a category from the list of categories ((1) to (11) inclusive) indicated in paragraph 1(b) of Schedule 1 to MSN1668(M). The minimum fire integrity and insulation standards of the bulkheads or decks separating adjacent spaces should be determined by cross referencing the categories of the spaces in the appropriate table in Schedule 1.

#### 14.5.2 Group of spaces

See paragraph 12.5.2 which applies in a similar manner.

#### 14.5.3 Separating spaces with partial bulkheads and enclosed promenades

See paragraph 12.5.3 which applies in a similar manner.

#### 14.5.4 Insulation values of spaces with special characters of two or more space categories and separating by wire mesh.

In cases where a space has the special characters of two or more space categories the insulation values of the divisions of such a space should be the highest for the space categories concerned. A separation made by wire mesh between two portions of a space is not considered a division for the purpose of categorising the space. [unified text]

#### 14.5.5 Doubt as to category of a space

See paragraph 12.5.5 which applies in a similar manner.

#### 14.5.6 Spaces used for unrelated purposes

A space should not be used for two or more unrelated purposes e.g. for stores and housing fans in which case the stores and fans should be located in a storeroom (Category 9) and a machinery space other than a machinery space of Category A (Category 7). It is inappropriate just to apply the category which provides the more stringent fire integrity and insulation standards to the boundary bulkheads and decks (in this case there are only minor differences) because the combined space may justify applying much more stringent standards and it would be impossible to compensate for the loss of the A-0 bulkhead which should separate the spaces.

#### 14.5.7 Spaces in more than one category

When a space may be included in more than one category e.g. a space containing a diesel driven emergency generator (Categories (1) and (6) or (7) whichever is applicable) then the category which should be used is the one which separates the space from an adjacent space.

#### 14.5.8 Stairways closed at one level and escape trunks

A stairway which is closed at one level or an escape trunk other than one which forms a continuous fire shelter from the lower part of a machinery space referred to in L.S. Regulation 84(3)(a), should be regarded as part of the space from which it is not separated by a fire door i.e. it should not be regarded as a Category (4) space. The category of the stairway or trunk should not be changed in such a case when it is intended to fit a non-combustible door having no fire resisting properties to the 'open' end of the stairway or trunk.

#### 14.5.9 Category of enclosed emergency escape trunks

A totally enclosed emergency escape trunk belongs to space Category (4). **[unified text]**

#### 14.5.10 Category of electrical equipment rooms

Electrical equipment rooms (auto-telephone, exchange, air conditioning duct spaces) are Category (7) spaces. **[unified text]**

#### 14.5.11 Weather decks used for cargo stowage

Weather decks used for cargo stowage should be considered as Category (8), except for cargoes which constitute a low fire risk. **[unified text]**

#### 14.5.12 Construction and arrangement of saunas

See paragraph 12.5.14 which applies in a similar manner.

#### 14.5.13 Pantries not containing cooking appliances

Pantries not containing cooking appliances should be included in Category (3). See paragraph 12.5.11 for the definition of such a pantry and the conditions under which a microwave oven may be fitted in such a pantry.

#### 14.5.14 Separation of machinery spaces from other spaces

See paragraph 12.5.15 which applies in a similar manner. Paragraph 12.5.15 should also apply to any arrangement involving a false deck (see paragraph 14.1.2).

#### 14.5.15 Continuous 'B' Class ceilings or linings as 'A' Class insulations (paragraph 1(c) of Schedule 1 to MSN 1668(M))

A continuous 'B' Class ceiling or lining should only be used as the insulating medium for 'A' Class decks or bulkheads as appropriate, when the boards or panels from which the ceiling or lining is constructed have been approved for such use. The ceiling or lining should be constructed in accordance with the conditions indicated on the approval certificate. See also paragraphs 11.4.1 and 11.4.2 and paragraph 11.4.5.

#### 14.5.16 External boundaries (paragraph 1(d) of Schedule 1 to MSN 1668(M))

##### *14.5.16.1 Windows and sidescuttle*

The outer boundaries of the hull, superstructures and deckhouses may be pierced by windows and sidescuttles which are not required by the regulations to meet any 'A' Class or 'B' Class standard. Surveyors should however recommend to shipbuilders and owners that any windows which are fitted in such boundaries within 3 m of the lifeboat and liferaft embarkation, stowage, handling and lowering positions should be fitted with an approved fire resisting glass. The glass to be fitted in accordance with the conditions stated in the approval certificate. This recommendation does not apply to windows fitted in a superstructure or deckhouse situated on any deck above the highest deck on which the lifeboat, liferaft or marine escape system positions are situated. See paragraph 11.15.2.

##### *14.5.16.2 Doors*

(a) Doors in the outer boundaries of superstructures and deckhouses may be of any material or construction subject to compliance with any of the Load Line requirements. However, any such doors which are within 3 m of the lifeboat and liferaft embarkation, stowage, handling and lowering positions should be of substantial steel construction except that any such door giving access to accommodation spaces may be of solid wood construction.

(b) 'A' Class door assemblies designed for interior use may not be suitable for use in external positions exposed to the weather, because of their light construction and susceptibility to corrosion.

#### 14.5.17 Boundaries and intersections (paragraph 2(e) of Schedule 1 to MSN 1668(M))

The fire integrity and insulation standards of an insulated 'A' Class divisions should be maintained at the boundaries of the division and where the division is abutted or intersected by other structure continuing the insulation along the structure adjacent to the division as indicated in paragraph 11.2.1.5.

#### 14.5.18 Superscriptions in tables 1 and 2 (paragraph 1(f) of Schedule 1 to MSN 1668(M))

##### *14.5.18.1 Superscription 'a'*

Where superscription 'a' appears in table 1 there are no special requirements applicable to the construction and erection of bulkheads separating accommodation spaces in a ship in which Method IIC has been adopted i.e. the bulkheads may be constructed of combustible or non-combustible materials and erected as the shipbuilder chooses subject to paragraph 14.4.3.

#### 14.5.18.2 *Superscription 'b'*

Where superscription 'b' appears in table 1 there are no special requirements applicable to the construction and erection of bulkheads separating accommodation spaces in a ship in which Method IIIC has been adopted i.e. bulkheads may be constructed of combustible or non-combustible materials and erected as the shipbuilder chooses subject to paragraph 14.4.4.

#### 14.5.18.3 *Superscription 'c'*

Where superscription 'c' appears in table 1 the A-0 standard or B-0 standard applies to the bulkheads which are required to enclose stairways and lifts as indicated in L.S. Regulation 75 (see paragraph 14.6.1).

#### 14.5.18.4 *Superscription 'd'*

(a) Where superscription 'd' appears in tables 1 and 2 the A-0 standard only applies to bulkheads and decks separating spaces which are used for different purposes e.g. in Category (9) in table 1, a bulkhead separating a galley and a paint room. A bulkhead or deck need not be fitted between two spaces used for the same or similar purposes e.g. two machinery spaces of other than Category A. However, if a shipbuilder decides to fit a bulkhead between two such spaces, the bulkhead need only be of steel having no fire integrity standard or may be of expanded metal.

(b) Similarly in Category (9) in table 1, a bulkhead need not be fitted between two storerooms having areas in excess of 2m<sup>2</sup> which are used for the same purpose or, if a bulkhead is fitted, it need have no fire integrity standard e.g. two provision storerooms. However the bulkhead separating two storerooms used for different purposes e.g. linen and provision storerooms should be of A-0 standard as specified in table 1.

#### 14.5.18.5 *Superscription 'e'*

Bulkheads separating control stations are required by table 1 to be of A-0 standard except that bulkheads separating the wheelhouse, chartroom and radio office may be of B-0 standard.

#### 14.5.18.6 *Superscription 'f'*

The cylinders containing the fire extinguishing medium for cargo spaces should be stored in a space which is not adjacent to the cargo spaces and which is easily accessible in the event of a fire in any cargo space. A storage space would be considered to be not adjacent to a cargo hold if it were separated from the cargo hold by either a vertical or horizontal cofferdam of 600mm minimum width or height respectively the cofferdam being insulated to A-60 standard on its boundary which is common with the cargo hold using an

approved 'A' Class insulation. The insulation should be applied to the hold side of the division. The insulation may be dispensed with if the cofferdam has sufficient openings to permit dissipation of heat to the atmosphere. The storage space should comply with the requirements of paragraph 2 of Schedule 4 to MSN 1666(M).

14.5.18.7 *Superscription 'g'*

(a) When dangerous goods other than dangerous goods of Class 1 are intended to be carried in a cargo space, any bulkheads and decks separating the cargo space from a machinery space of Category A are required by paragraph 3(m) of MSN 1669(M) to be insulated to A-60 standard except that the A-60 insulation on the bulkheads may be dispensed with if the dangerous goods are stowed at least 3 m clear of such bulkheads including stepped or recessed portions. Figures 14.1 and 14.2 illustrate this paragraph.

(b) When dangerous goods of Class 1 are intended to be carried in a cargo space, any bulkheads and decks separating the cargo space from a machinery space of Category A are required by paragraph 3(m) of MSN 1669(M) to be insulated to A-60 standard including any stepped or recessed portions of such a bulkhead and the dangerous goods are to be stowed at least 3 m clear of such bulkheads including any stepped or recessed portions. Figure 14.3 illustrates this paragraph.

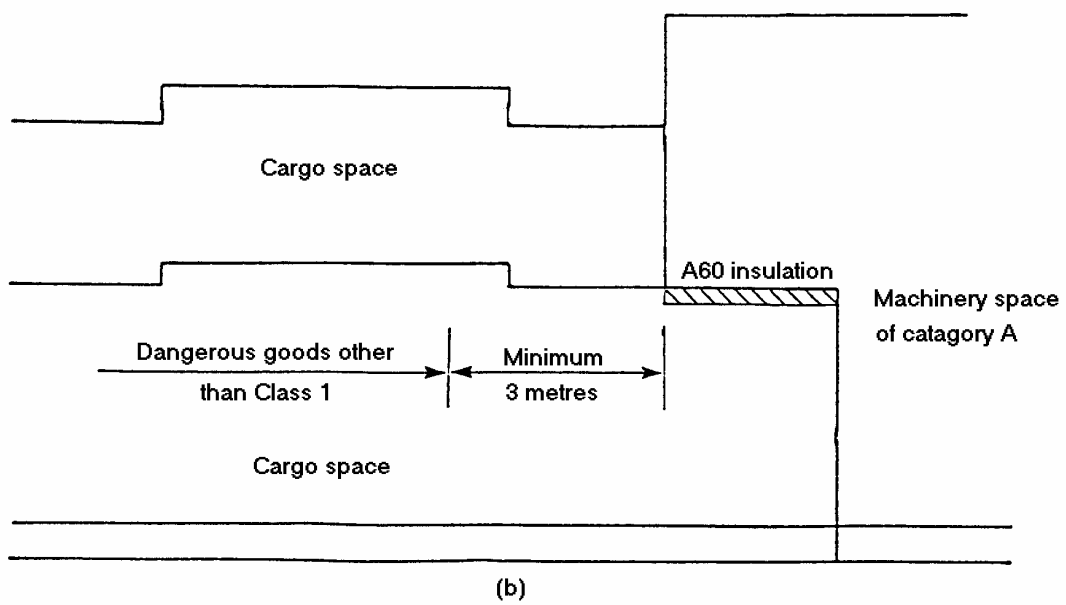
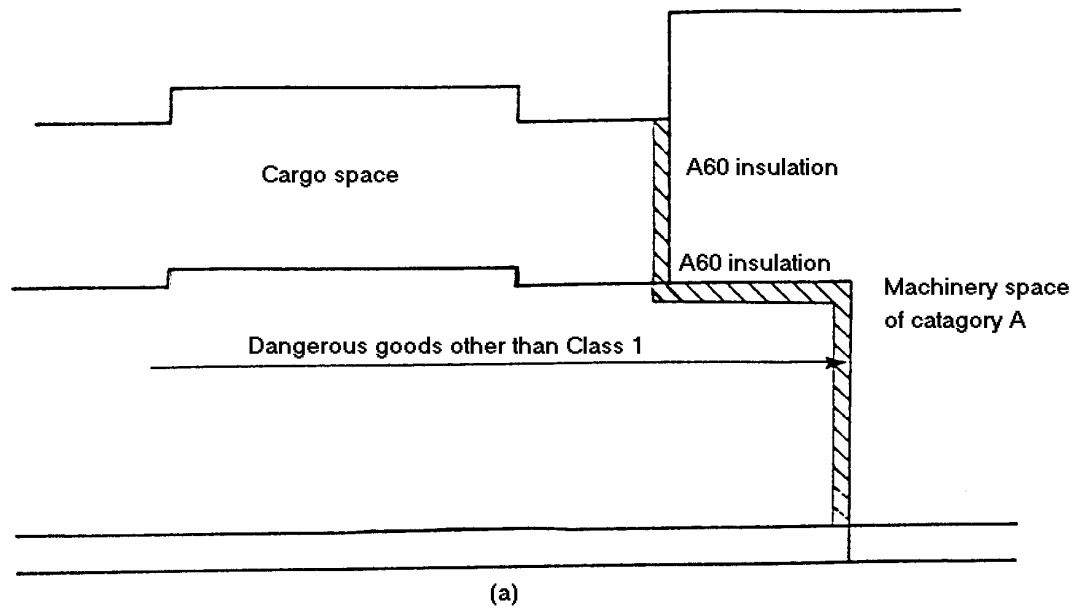


Fig 14.1 Dangerous goods other than those of Class 1

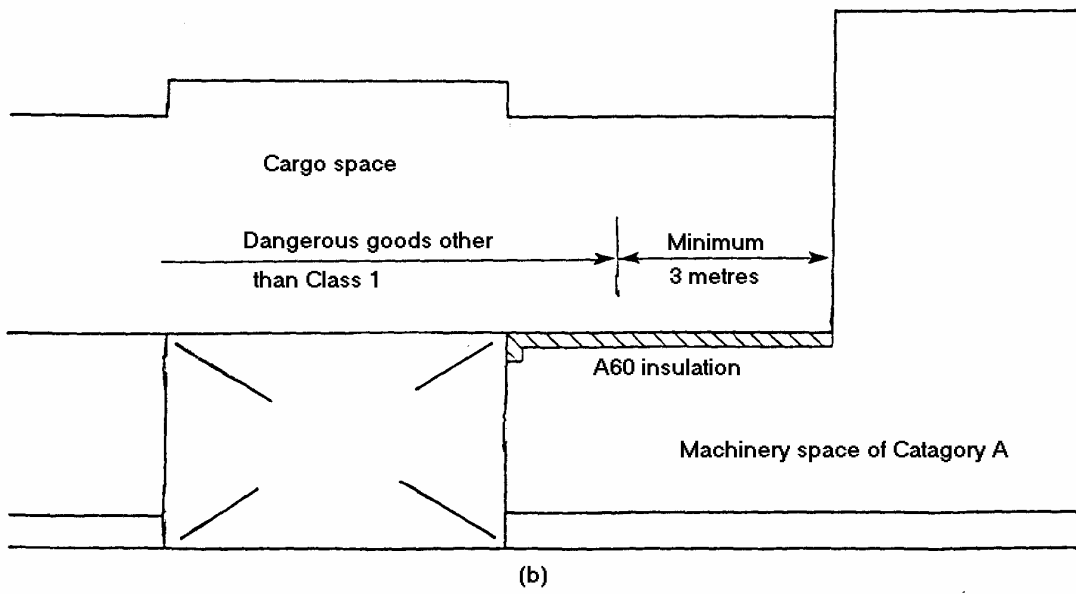
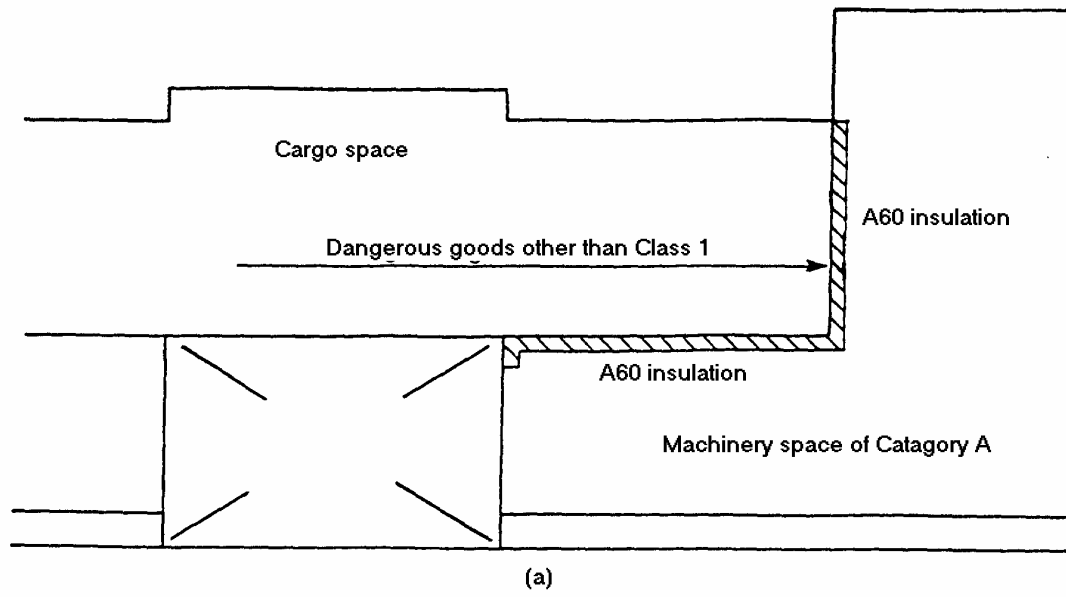


Fig 14.2 Dangerous goods other than those of Class 1

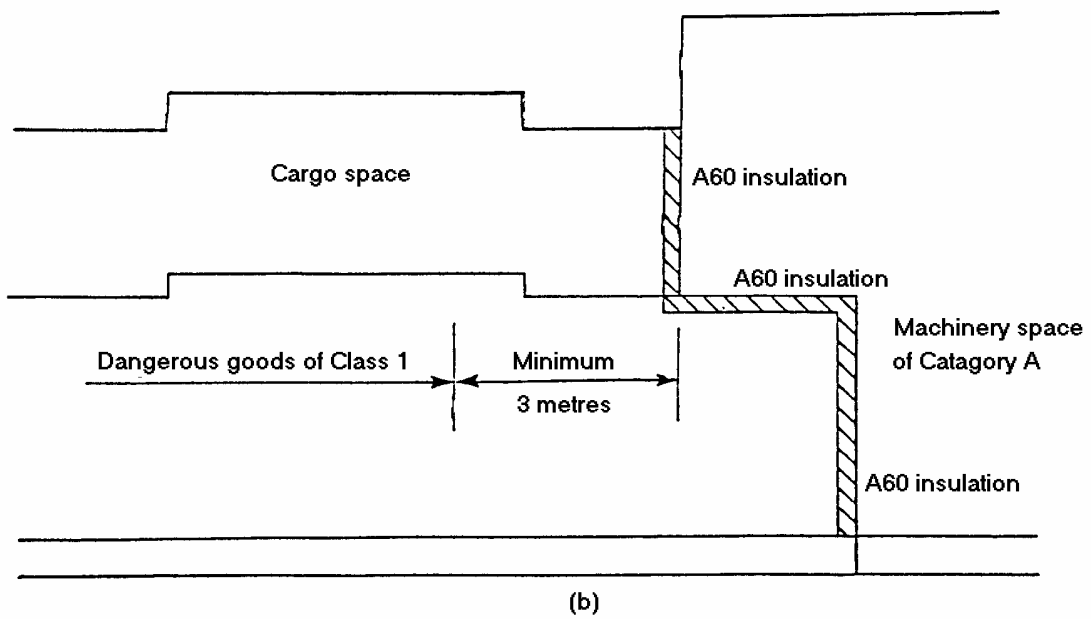
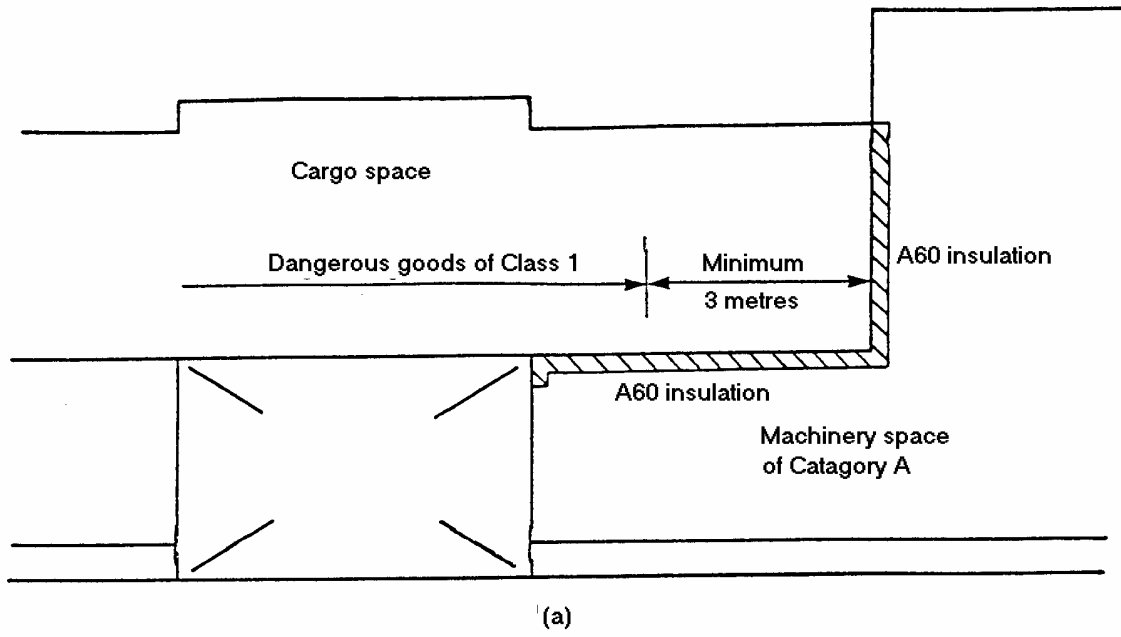


Fig 14.3 Dangerous goods of Class 1

#### 14.5.18.8 *Superscription 'h'*

Decks separating Ro-Ro cargo spaces should be gastight. However any opening between such spaces other than an opening required by the Load Line Regulations to be fitted with a watertight closing device, should be fitted with a steel door or cover which should be gas tight as far as is reasonably practicable to the satisfaction of the surveyor. In addition any such opening which is used for access should be fitted with a self closing steel door or cover which should not be capable of being held in the open position.

#### 14.5.18.9 *Superscription 'i'*

Where a superscription 'i' appears in table 2 the A-60 insulation need not be fitted to a deck separating a machinery space of Category A and a space containing either:

- (a) auxiliary machinery not having a pressure lubricating system and not having any combustibles stowed in the space;
- (b) ventilation and air conditioning machinery; or
- (c) switchboards and major electrical equipment except oil-fire electrical transformers above 10 kVA and switchboards and electrical equipment used for emergency purposes.

This relaxation does not apply to spaces containing minor electrical equipment such as section switchboards, fuse boxes and junction boxes.

#### 14.5.19 An asterisk in the tables

14.5.19.1 Where an asterisk appears in tables 1 and 2 of Schedule 1 to MSN 1668(M), the bulkheads and decks are required to be of steel or equivalent material but need to have no 'A' Class standard except that the crowns and casings of machinery spaces of Category A are required by L.S. Regulation 70 to be constructed only of steel. However, where such a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts, such penetrations should be made tight to prevent the passage of flame and smoke. **[unified text]** When such bulkheads and decks are constructed of aluminium alloy, paragraphs 14.2.3 and 14.2.4 should apply.

14.5.19.2 Notwithstanding the provision of an asterisk in the tables, any of the following structure which is constructed of aluminium alloy should be an 'A' Class division of A-0 standard:

- (a) any part of the hull or sides of a superstructure or deckhouse which does not support the lifeboat and liferaft embarkation, stowage, handling and lowering positions but is within 3 m of such positions; and

(b) the ends and sides of any superstructure or deckhouse which overlook a deck, walkway or stairway which may be used as an escape route from accommodation spaces, service spaces, control stations or machinery spaces to the lifeboat or liferaft embarkation deck, the superstructure or deckhouse not being one which supports the lifeboat and liferaft embarkation, stowage, handling and lowering positions.

## 14.6 Protection of Stairways and Lifts (L.S. Regulation 75)

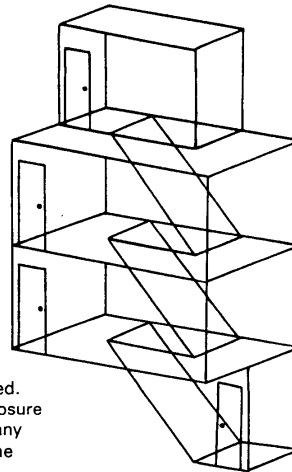
### 14.6.1 Construction and insulation (L.S. Regulation 75(1))

14.6.1.1 The stiles, treads, and if fitted backing plates, of stairways should be constructed of steel except that they may be constructed of aluminium alloy suitably insulated when the structure is of aluminium alloy.

14.6.1.2 Every stairway and lift is required by L.S. Regulation 75(1) to lie within an enclosure or trunk constructed of 'A' Class divisions of A-0 standard, except that an isolated stairway serving only two decks need only be enclosed at one level by 'A' Class divisions of A-0 standard or 'B' Class divisions of B-0 standard. However when a stairway abuts a machinery space of Category A or a Ro-Ro cargo space, the bulkhead or deck separating the stairway from the machinery space or cargo space is to be determined respectively by reference to table 1 or 2 in Schedule 1 to MSN 1668(M).

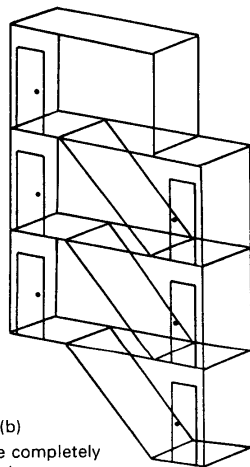
14.6.1.3 Figure 14.4 shows three acceptable methods of enclosing stairways on cargo ships when the stairways serve more than two decks.

(a) It should be noted however that the arrangement shown in figure 14.4(a) provides a much safer means of escape and access for fire parties than the arrangements in figures 14.4(b) and (c) should the corridors become filled with smoke. Furthermore, the arrangement shown in figure 14.4(a) imposes no more restrictions on the accommodation layout than the other two arrangements as can be seen by comparing the plan views in figure 14.5.



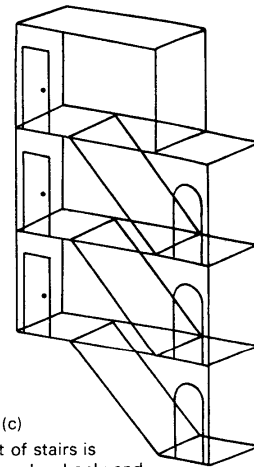
(a)

Stairs are completely enclosed. A person may enter the enclosure at any level and proceed to any other level without leaving the enclosure.



(b)

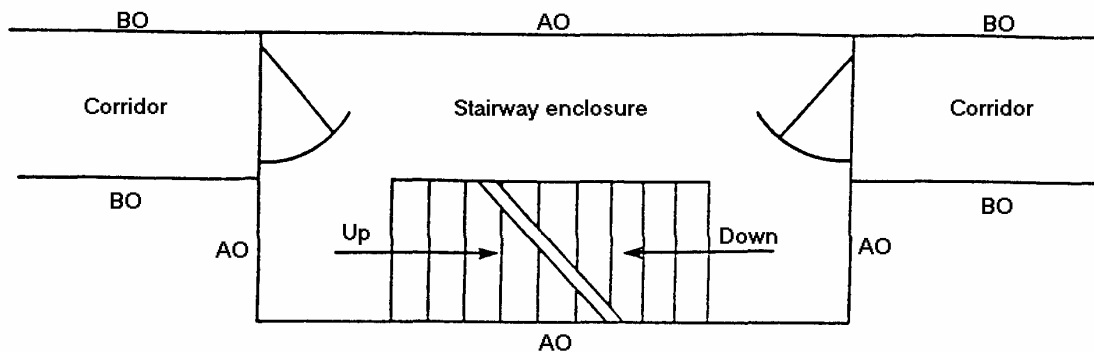
Stairs are completely enclosed, but a person cannot proceed to all levels without having to leave the enclosure. The stairs may have open treads i.e. no risers except in the bottom flight.



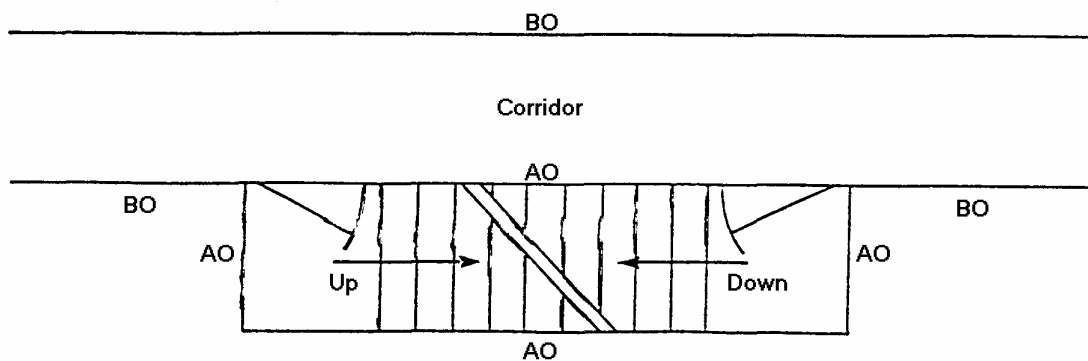
(c)

Each flight of stairs is closed at one level only and open to a corridor. Stairs are solid i.e. fitted with risers.

Fig 14.4 Stairways serving more than two decks



Plan view of stairway similar to that shown in Figure 14.4(a)



Plan view of stairway similar to that shown in Figure 14.4(b)

Fig 14.5

(b) Shipbuilders and shipowners should be recommended by surveyors to incorporate the arrangement shown in figure 14.4(a) in accommodation layouts whenever possible.

(c) When it is not possible to arrange a stairway enclosure as indicated in figure 14.4(a) then the arrangement shown in figures 14.4(b) is preferred to that shown in figure 14.4(c). Furthermore, the arrangement shown in figure 14.4(b) could be improved by fitting flush hatches with hinged steel covers in the landings marked 'X' on the drawing and vertical ladders in the tweendecks marked 'Y'. This improvement would permit a person entering the stairway enclosures at any level to proceed to any other level without having to leave the enclosures.

14.6.1.4 Stairway enclosures and lift trunks constructed of steel which are required by the tables in Schedule 1 to MSN 1668(M) to be insulated, may be insulated on either side, but in any case measures should be taken to prevent heat transmission through divisions in way of decks, landings etc.

#### 14.6.2 Openings in stairway enclosures (L.S. Regulation 75(2))

Openings in stairway enclosures should be fitted with approved doors of the same 'A' Class or 'B' Class standard as the bulkhead in which they are fitted except that approved drop rolling shutters may be fitted in lieu of a door to an opening in an enclosure bulkhead of A-0 standard.

#### 14.6.3 Access into stairway enclosures

Stairway enclosures should be connected to corridors. As far as is reasonably practicable spaces containing combustibles such as cabins, offices, storerooms, lockers etc. should not be situated in a stairway enclosure or have direct access into the enclosure.

#### 14.6.4 Lift trunks in stairway enclosures

14.6.4.1 The boundaries and doors of a lift trunk which is situated within a stairway enclosure are not required to meet any 'A' Class standard provided that:

(a) any boundary of the lift trunk which forms part of the stairway enclosure is an 'A' Class division of the appropriate standard specified in tables 1 and 2 in Schedule 1 to MSN 1668(M); and

(b) any opening in the lift trunk which gives direct access to any space situated outside the stairway enclosure is provided with an approved lift door of the same 'A' Class standard as the bulkhead in which it is fitted.

A lift trunk extending above or below a stairway enclosure may be treated in the same manner.

#### 14.6.5 Means of closure (L.S. Regulation 75(2))

Each opening in a lift trunk should be provided with an approved lift door of the same 'A' Class standard as the bulkhead in which it is fitted, except for any opening provided with a door which is not required to meet any 'A' Class standard as indicated in paragraph 14.6.4.

### 14.7 **Openings in 'A' Class Divisions (L.S. Regulation 76)**

#### 14.7.1 General comment

14.7.1.1 When an 'A' Class division is intersected or abutted by other structure or penetrated for any purpose, the fire integrity and insulation standard of the division should be maintained in way of such an intersection, abutment or penetration, noting that:

- (a) structural intersections and abutments should be dealt with respectively in the case of insulated divisions by continuing the insulation along such structure as indicated in paragraph 11.2.1.5;
- (b) pipes and cables penetrating 'A' Class divisions should be dealt with as indicated respectively in paragraphs 11.4 and 11.5; and
- (c) ventilation ducting which penetrates 'A' Class divisions should be dealt with as indicated in paragraph 14.9.

#### 14.7.2 Hatches in 'A' Class decks

14.7.1.2 Details of the construction and method of insulating and sealing any hatch fitted in an 'A' Class deck should be submitted to Headquarters for consideration.

14.7.1.3 See paragraph 14.5.18.8 regarding hatches fitted in decks separating Ro-Ro cargo spaces.

#### 14.7.3 Doors and shutters in 'A' Class divisions (L.S. Regulations 76(2), (3), (4), (5) and (6))

Paragraph 12.7.4 applies in the same manner as it applies to L.S. Regulations 58(4), (5) and (6) except that the requirements in L.S. Regulations 76(4) and (6) for doors to be self-closing only applies to the doors when the ship is in the upright position even though the regulations do not specifically state this.

#### 14.7.4 Watertight doors in 'A' Class divisions (L.S. Regulation 76(7))

See paragraph 12.7.3 which applies in a similar manner.

### 14.8 **Openings in 'B' Class Divisions (L.S. Regulation 77)**

#### 14.8.1 General comment

14.8.1.1 When a 'B' Class division is intersected by structure or penetrated for any purpose, the fire integrity standard of the division should be maintained in way of such intersection or penetration, noting that:

- (a) pipes and electric cables penetrating 'B' Class divisions should be dealt with as indicated respectively in paragraphs 11.8 and 11.9;
- (b) ventilation ducting which penetrates 'B' Class divisions should be dealt with as indicated in paragraph 14.9; and
- (c) lighting fittings in 'B' Class ceilings should be dealt with as indicated in paragraph 11.7.9 and that access panels in 'B' Class ceilings and linings should be in accordance with paragraph 11.7.8.

## 14.8.2 Doors in 'B' Class divisions (L.S. Regulations 77(2), (3), (4) and (5))

14.8.2.1 Paragraph 12.8.2 applies in the same manner as it applies to L.S. Regulation 59 except that a ventilation opening should not be provided in a door fitted in a 'B' Class bulkhead forming a stairway enclosure, and the gap under such a door should not exceed 6mm.

14.8.2.2 Additionally any door fitted in a 'B' Class bulkhead forming a stairway enclosure is required by L.S. Regulation 77(4) to be fitted with a closing device which will close the door in the upright position when the door is released from an open position. Any such door is permitted by L.S. Regulation 77(5) to be held in the open position subject to the hold-back arrangements having remote release fittings which on disruption of the control system will permit the closing device to close the door and the arrangements also allowing the door to be closed manually. When energised, electro-magnets are used to hold-back such doors the arrangements should comply with paragraph 11.6.4 except that the requirement for doors to be self-closing only applies to the doors when in the upright position. When a shipbuilder or shipowner proposes to use hold-back arrangements other than those incorporating energised electro-magnets, full details should be submitted to Headquarters for consideration.

## 14.9 **Ventilation Systems (L.S. Regulation 78 and Schedule 3 to MSN 1668(M))**

### 14.9.1 General comment

14.9.1.1 The ventilation systems serving the following spaces should be independent of accommodation spaces, service spaces and control stations and should be independent of each other:

- (a) a stairway enclosure;
- (b) a galley or galley complex;
- (c) a machinery space of Category A or group of machinery spaces;
- (d) a cargo space or group of cargo spaces; and
- (e) a Ro-Ro cargo space.

14.9.1.1 The ducting of a ventilation system serving a space or group of spaces fitted with a fixed gas fire extinguishing system should be of steel and of 'A' Class and gas tight construction where it passes through a space not served by the extinguishing system.

14.9.1.2 The ventilation system serving a space in which gas cylinders are stored should not serve or pass through any other space and should be capable of freeing the space of any gas which may leak from the cylinders.

### 14.9.2 Smoke control (L.S. Regulation 78(1))

Where the arrangement of ducts in a ventilation system is such that smoke and hot gases may pass from one 'tween deck to another, a damper should be fitted in the duct on the upper side of the deck separating the 'tween decks. The dampers may be approved manually controlled fire dampers or simply manually controlled steel dampers fitted in a readily accessible position. Each simple damper should be a reasonably close fit inside the duct and capable of being locked in the open and closed positions. Alternatively when the ducts are of steel their closure may be achieved by the shutting of punkah louvres or grilles fitted to the openings in the branch trunking 'tween deck.

#### 14.9.3 Vertical ducts (L.S. Regulation 87(1))

14.9.3.1 For the purpose of Regulation 87(1) a vertical duct is a duct which passes through more than one deck. This regulation requires vertical ducts to be insulated as required by the tables in Schedule 1 to MSN 1668(M). Compliance with this requirement may be achieved in the case of vertical ducts which are fitted with fire dampers by insulating each damper coaming to the 'A' Class standard of the deck through which the duct passes to the extent shown in figure 12.7.

14.9.3.2 Vertical ducts having a cross sectional area not exceeding 0.02m<sup>2</sup> which pass through 'A' Class decks are not required to be fitted with fire dampers. Such vertical ducts should be insulated to the same 'A' Class standard as the decks through which they pass by continuing the insulation fitted to the deck plating along the ducts for a distance of not less than 380mm from the deck plating.

14.9.3.3 Ducts of not less than 0.075m<sup>2</sup> cross sectional area and all vertical ducts are required by paragraph 1 of Schedule 3 to MSN 1668(M) to be constructed of steel or other equivalent material. Where an equivalent material such as aluminium alloy is contemplated the shipbuilder should be informed that the inside and outside of the ducts would need to be insulated to A-0 standard.

#### 14.9.4 Air supply to control stations (L.S. Regulation 78(3))

The two entirely separate means of supplying air control to the stations referred to in L.S. Regulation 78(3) may serve other spaces but in no case should they serve the same spaces. However it would be preferable for at least one means of supplying air to be independent of any other space. Local closing arrangements mean, in the case of ventilation trunks, fire or smoke dampers capable of being closed manually from within the station.

#### 14.9.5 Ducts from machinery of Category A, galleys etc. (paragraph 2 of Schedule 3 to MSN 1668(M))

14.9.5.1 It should be noted that double and single skinned spiroducts are precluded from use in the situations referred to because they are not constructed of steel of the required thickness.

14.9.5.2 The fail-safe automatic closing fire damper required by paragraph 2(a)(iii) of Schedule 3 should be fitted on the opposite side of the boundary penetrated to that of the spaces which it serves. The manual controls of the dampers should be readily accessible and the operating position clearly marked.

14.9.5.3 Care should be taken to ensure that the A-60 standard of the portion of ducting which is required by regulation paragraph 2(a)(iv) of Schedule 3 to be insulated, is not impaired where the ducting passes through a deck or adjoins another structure. It should be borne in mind that the intention of the requirement is to protect the accommodation spaces etc. from a fire in the machinery space of Category A, galley etc.

14.9.5.4 Similar care should be taken when the alternative method of protecting accommodation spaces etc. indicated in paragraph 2(b) of Schedule 3 to MSN 1668(M), is adopted.

#### 14.9.6 Ducts from accommodation spaces etc. (paragraph 3(a) and (b) of Schedule 3 to MSN 1668(M))

See paragraph 14.9.5 which applies in a similar manner.

#### 14.9.7 Galley ventilation (paragraph 4 of Schedule 3 to MSN 1668(M))

14.9.7.1 The fail-safe automatic closing fire damper referred to in paragraph 4 of Schedule 3 should be positioned below the grease trap and the fixed means of extinguishing a fire referred to in paragraph 4(d) of Schedule 3 should be capable of extinguishing a fire situated anywhere above it from the exhaust duct. The fire damper should be provided with manual control operable from an accessible position clear of the equipment which the exhaust duct serves.

14.9.7.2 In all cases when an exhaust duct is fitted with branches serving different items of galley equipment, the requirements of paragraph 4 of Schedule 3 should apply to each branch. In such cases remote control of the fire dampers in the exhaust trunk branches may be necessary; even in those ships which are not required to comply with paragraph 4(b) of Schedule 3. Where compliance with these standards is not necessary because a galley exhaust duct does not pass through accommodation spaces or spaces containing combustibles e.g. when the duct goes directly to the open air from the galley, then L.S. Regulations 47(1)(a) and 47(1)(b) should be complied with in respect of stopping the fan and providing a means of closure at the duct outlet. It would be sensible in such a case to fit a grease trap in the duct.

#### 14.9.8 Openings for recirculating or exhausting air or balancing systems

14.9.8.1 L.S. Regulation 77(3) permits openings in the lower part of 'B' Class doors through which air from cabins and public spaces may be taken via the corridors and ducting to the air conditioning machinery room for recirculation or to the atmosphere. 'B' Class bulkheads should not be penetrated by openings other than those in the lower part of the doors or within ducting irrespective of the openings being fitted with shutters or dampers. Open-ended steel coamings should not be regarded as ducting.

14.9.8.2 Air from spaces surrounded by 'A' Class divisions should not be exhausted directly into corridors for recirculating or for return to the atmosphere through openings or open-ended coamings irrespective of the openings or coamings being fitted with shutters or dampers. Such spaces should be fitted with exhaust ducting to the fan room or to the atmosphere. Similarly high risk spaces such as galleys should not be provided with recirculating, balancing or exhaust openings or open-ended coamings into adjacent accommodation spaces.

14.9.8.3 Openings for recirculation of air or balancing a ventilation system may be provided between corridors in separate 'tween decks provided that they are trunked into the corridors with no openings into the ceiling or lining voids and comply with constructional requirements (including the provision of fire and smoke dampers) of L.S. Regulation 78 and Schedule 3 to MSN 1668(M). They should normally be fitted with sliding or hinged steel shutters at their ends.

#### 14.9.9 Ducts passing through 'A' Class divisions (L.S. Regulation 78(1))

See paragraph 12.9.11 which applies in a similar manner except that paragraph 12.9.11.2 does not apply.

#### 14.9.10 Fire resisting ducts (L.S. Regulation 78(1))

See paragraph 12.9.12 which applies in a similar manner except that paragraph 12.9.12.2 does not apply.

#### 14.9.11 Ducts passing through 'B' Class divisions (L.S. Regulation 78(1))

See paragraph 12.9.13 which applies in a similar manner.

#### 14.9.12 Fire dampers

See paragraph 12.9.14 which applies in a similar manner.

### **14.10 Details of Construction (L.S. Regulation 79)**

#### 14.10.1 Method IC (L.S. Regulation 79(1))

14.10.1.1 L.S. Regulation 79(1) requires ceilings, linings, draught stops and their associated grounds in accommodation spaces, service spaces and control stations to be non-combustible. Consequently any ceiling or lining which is neither the insulating medium for an 'A' Class division nor a 'B' Class division, should be of 'C' Class standard i.e. constructed of non-combustible materials but having no fire integrity and insulation standards. 'C' Class divisions should be constructed as indicated in paragraph 11.6.

14.10.1.2 Window and sidescuttle boxes should be constructed as indicated in paragraph 11.12.

14.10.1.3 Draught stops should be constructed as indicated in paragraph 12.11.6.3. See also paragraph 14.12.6.

#### 14.10.2 Methods IIC and IIIC (L.S. Regulation 79(2))

14.10.2.1 L.S. Regulation 79(2) requires ceilings, linings, draught stops and their associated grounds in corridors and stairway enclosures serving accommodation spaces, service spaces and control stations to be non-combustible. Consequently any such ceiling or lining which is neither the insulating medium for an 'A' Class division nor a 'B' Class division, should be of 'C' Class standard i.e. constructed of non-combustible materials but having not fire integrity and insulation standards. 'C' Class divisions should be constructed as indicated in paragraph 11.11.

14.10.2.2 Windows and sidescuttle boxes should be constructed as indicated in paragraph 11.12.

14.10.2.3 Ceilings, linings, draught stops and their associated grounds, other than those fitted in corridors and stairway enclosures serving accommodation spaces, service spaces and control stations, may be combustible except when such ceilings and linings are either the insulating media for 'A' Class divisions or continuous 'B' Class divisions. There are no restrictions applied to combustible ceilings and linings subject to compliance with the Merchant Shipping (Crew Accommodation) Regulations 1997 and provided that:

- (a) ceilings and linings are not constructed of organic foams, cork or other highly flammable materials capable of producing large quantities of smoke or toxic products; and
- (b) ceilings are not constructed of sheets of polyvinyl chloride or similar materials which will soften at relatively low elevated temperatures and may collapse on sleeping cabin occupants during the early stages of a fire situation. Such materials may not necessarily contain highly flammable base products and may have a Class 2 surface spread of flame rating.

However, these provisions do not apply to ceilings constructed of plywood, chipboard, steel or aluminium alloy either unfaced or faced with decorative laminates, paints or other surface finishes.

14.10.2.4 Any draught stop fitted in the corridors or stairway enclosures should be constructed as indicated in paragraph 12.11.6.3. See also paragraph 14.12.6.

- (a) Draught stops other than those fitted in corridors and stairway enclosures may be constructed as indicated in paragraph 12.11.6.3 and may be constructed of combustible board type materials such as plywood or chipboard of not less than 6mm thickness supported by steel or wooden grounds attached to the ships structure, bulkheads, ceilings or linings and fitted tightly to such structure and divisions subject to compliance with paragraph 14.11.1. See also paragraph 14.12.6.

## **14.11 Restriction of Combustible Materials (L.S. Regulation 80)**

### **14.11.1 Exposed and concealed surfaces requiring a Class 1 spread of flame rating (L.S. Regulation 80)**

See paragraph 12.11.1 which applies in a similar manner. (See also paragraph 14.11.7 for the limitations in the thickness of combustible laminates, veneers, wallcoverings etc. which are permitted to be bonded to non-combustible bulkheads, ceilings and linings).

### **14.11.2 Primary deck coverings (L.S. Regulation 80(2))**

See paragraph 12.11.5 which applies in a similar manner.

### **14.11.3 Exposed surfaces requiring a Class 2 spread of flame rating (L.S. Regulation 80(3))**

L.S. Regulation 80(3) requires paints, varnishes and other surface finishes in accommodation spaces, service spaces, control stations and machinery spaces not to contain nitro-cellulose or other highly flammable base products and not to be capable of producing excessive quantities of smoke. Any surface finish material which achieves a Class 1 or 2 surface spread of flame rating when tested in

accordance with British Standard 476: Part 7: 1997 is considered not to contain highly flammable base products in compliance with this regulation. Such surface finish materials are to have been tested and approved before use.

#### 14.11.4 Application of surface finish

In no case should the method of applying a surface finish be changed, or the surface finish be applied to a different substrate from that on which it was tested, without the prior consent of Headquarters.

#### 14.11.5 Approved paint schemes

14.11.5.1 An approved paint scheme may be subsequently overcoated with paints from the same scheme or any other approved paint scheme, provided that:

- (a) the paints are compatible when the paint scheme is to be over-coated with a different approved paint scheme; and
- (b) the surface of the original scheme is properly prepared before overcoating e.g. flaking paint to be removed; grease, dirt and oil to be removed etc.

#### 14.11.6 Approved non-combustible materials

Approved non-combustible materials which are used without any surface finishes may be accepted as having a Class 2 surface spread of flame rating without having been subjected to a surface spread of flame test.

#### 14.11.7 Surface floor coverings

14.11.7.1 Surface floor coverings need not be tested to the above mentioned British Standard provided that they have been approved as deck coverings before use.

14.11.7.1 Surface floor coverings should not be laid under 'A' Class insulations, 'B' Class bulkheads or linings and 'C' Class divisions.

#### 14.11.8 Production of smoke

14.11.8.1 See paragraph 12.11.7 which applies in a similar manner, except as regards the dates when the tests referred to, should commence. It is recommended that such tests commence as soon as practicable.

14.11.8.2 L.S. Regulation 80(3) indicates that the Class 2 surface spread of flame rating does not apply to the surfaces of furniture, furnishings, machinery and similar items. However furniture, other than any upholstered parts, should not be constructed of organic foams, cork or any other highly

flammable materials or other materials capable of producing large quantities of smoke or toxic products. This does not apply to wood or wood products, surface finishes such as laminates and veneers and plastic trim, skirtings etc.

14.11.8.3 It is recommended that the upholstered parts of furniture should comply with the cigarette and butane flame tests of British Standard 5852: Part 1: 1979.

#### 14.11.9 Insulating materials (L.S. Regulation 80(4))

14.11.9.1 Insulating materials which are used on a cargo ship for fire, thermal (comfort), acoustic or any other purpose are required by L.S. Regulation 80(4) to be non-combustible except that this requirement does not apply to:

- (a) cargo spaces;
- (b) refrigerated compartments; and
- (c) valves in hot and cold service systems provided that the exposed surfaces of the combustible insulation have a Class 1 surface spread of flame rating.

14.11.9.2 The exception referred to in paragraph (a)(iii) above, may include refrigerating machinery. When considering exposed surfaces in connection with insulating materials such surfaces should include the substrate insulation in the thickness used, or the greatest thickness permitted by the test method for the specimen construction whichever is greatest.

14.11.9.3 Where organic foams, cork or other highly flammable materials or materials known to readily emit toxic products when decomposing are used to insulate refrigerated compartments, the compartments should be located as remotely as practicable from the accommodation spaces. However when such spaces are adjacent to accommodation spaces the bulkheads and their supporting decks separating the compartments from the accommodation should be of gastight construction and any door in such bulkheads should be of gastight construction in compliance with the Merchant Shipping (Crew Accommodation) Regulations 1997 - Regulation 31 refers. Notwithstanding the 'A' Class integrity and insulation standards required by the tables in Schedule 1 to MSN 1668(M), the bulkheads and decks separating accommodation spaces, service spaces, control stations and machinery spaces from such refrigeration compartments should be insulated on the outside of the refrigeration compartments to A-60 standard. The insulation in the refrigerated compartments should be faced with galvanised steel or aluminium alloy sheets having a minimum thickness of 1.0mm and 1.5mm respectively. See also paragraphs 11.17 and 12.5.12.

#### 14.11.10 Oil and oil vapour barriers (L.S. Regulation 80(4)(a)(iv))

See paragraph 12.11.5 which applies in a similar manner.

#### 14.11.11 Adhesives (L.S. Regulation 80(4)(a)(iv))

Adhesives are not required to be tested individually and are not approved individually by the MCA. The type of adhesive which is used in practice to bond the surface finish materials referred to in paragraphs 14.11.1, 14.11.3 and 14.11.4 to a substrate is required to be the same as that used to bond the samples of the finish materials which have been subjected to the surface spread of flame test.

#### 14.11.12 Limitations in thicknesses of laminates, veneers etc. (L.S. Regulation 80(4)(b) and (c))

14.11.12.1 Non-combustible bulkheads, ceilings and linings in accommodation spaces, service spaces and control stations are permitted to be faced with laminates, veneers, wallcoverings etc. which are not to exceed 2mm in thickness in corridors, stairway enclosures and control stations where they are not to exceed 1.5mm in thickness. See also paragraphs 14.11.1 and 14.11.3.

14.11.12.2 There are no limitations in the thickness of laminates, veneers etc. applied to bulkheads, ceilings and linings which are permitted to be combustible subject to compliance with paragraphs 14.11.1 and 14.11.3.

### 14.12 **Miscellaneous Items of Fire Protection (L.S. Regulation 81)**

#### 14.12.1 Pipes penetrating 'A' and 'B' Class divisions (L.S. Regulation 81(1))

The treatment of pipes which penetrate 'A' Class and 'B' Class divisions should be as indicated in paragraphs 12.7.1 and 12.8.1 respectively.

#### 14.12.2 Materials used for oil pipes (L.S. Regulation 81(2))

See paragraph 12.12.2 which applies in a similar manner.

#### 14.12.3 Overboard scuppers, discharges etc. (L.S. Regulation 81(3))

See paragraph 12.12.3 which applies in a similar manner.

#### 14.12.4 Electric space heaters (L.S. Regulation 81(4))

See paragraph 12.12.8 which applies in a similar manner.

#### 14.12.5 Oil and oil vapour barriers (L.S. Regulation 81(7))

See paragraph 12.12.4 which applies in a similar manner.

#### 14.12.6 Draught stops (L.S. Regulation 81(8))

14.12.6.1 Care should be taken to ensure that where 'C' Class or combustible ceilings and linings are not extended respectively to the ships side and deckhead, the combined length of air spaces behind the ceiling and lining is used to determine the spacing of draught stops.

14.12.6.2 Draught stops should be fitted in the air space behind ceilings which are perforated or slatted when the air space exceeds 14 m in length or breadth because a fire could quite rapidly develop in such a space and would nearly be as difficult to control, as a fire behind an unperforated ceiling.

14.12.6.3 Draught stops should be constructed as indicated in paragraphs 14.10.1 and 14.10.2.4.

#### 14.12.7 Closure of decks (L.S. Regulation 81(8))

L.S. Regulation 81(8) requires air spaces behind ceilings and linings to be closed at each deck. The integrity and insulation standards of decks as specified in table 2 in Schedule 1 to MSN 1668(M) are to be maintained in the air spaces behind ceilings and linings as though such air spaces are part of the accommodation spaces, service spaces or control stations, as appropriate, from which they are separated by the ceiling or lining. The air space behind ceilings and linings cannot be regarded as void spaces because the ceilings and linings separating the air spaces from the accommodation spaces and service spaces would have to be 'A' Class divisions of A-0 standard in the case of control stations (voids being Category (7) spaces) in compliance with tables 1 and 2 in Schedule 1.

#### 14.13 Sprinkler and Detector Systems (L.S. Regulation 82)

See paragraph 12.13 which applies in a similar manner.

In the case of stairways serving more than two decks, a smoke detector should be fitted under each deck or landing.

#### 14.14 Special Arrangements for Machinery Spaces (L.S. Regulation 83)

14.14.1 For the purpose of L.S. Regulation 83(b) sidescuttles should be regarded as windows.

14.14.2 The lightweight fire-screen door referred to in L.S. Regulation 83(c) should be constructed of steel having a minimum thickness of 3mm flanged on all sides, the flanges overlapping a simple steel coaming fitted round the opening in the bulkhead on the shaft tunnel side. The door should be adequately stiffened, have steel hinges, a steel handle on each side of the door and a steel latch operable from each side of the door. Alternatively a sliding door of similar construction may be accepted, having smoke baffles fitted to its top and trailing edges and steel coaming. The leading edge of the door should engage a channel attached to the steel

coaming and be fitted with a steel latch operable from each side of the door and providing positive engagement with the channel web.

## **CHAPTER 14 - PART B**

### **TANKERS OF 500 TONS AND OVER (TO WHICH PART VIII OF THE L.S. REGULATIONS APPLY)(L.S. REGULATIONS 85 - 100)**

#### **14.15 Structure (L.S. Regulation 86(1))**

False decks - See paragraph 14.1.2 which applies in a similar manner.

#### **14.16 Aluminium Structure (L.S. Regulation 86(2))**

##### 14.16.1 Insulating the structure

14.16.1.1 Tables 3 and 4 in Schedule 2 to MSN 1668(M) require all bulkheads and decks to be 'A' Class or 'B' Class divisions except for those bulkheads which are permitted to be 'C' Class divisions and those bulkheads and decks which have an asterisk notation and are consequently permitted by paragraph 1(g)(ii) of Schedule 2 to be of aluminium alloy with no 'A' Class standard.

14.16.1.2 Additionally however, all aluminium alloy bulkheads and decks except for 'C' Class bulkheads and bulkheads and decks with no 'A' Class standard are required by L.S. Regulation 52(2)(a) to be insulated such that the temperature of their structural core does not rise more than 200°C above the ambient temperature when subjected to a standard fire test of 60 minutes and 30 minutes duration in the case of 'A' Class divisions and 'B' Class division respectively. See also paragraphs 11.2.1.4, 11.2.2.2 and 14.20.14.

##### 14.16.2 Approved insulations

See paragraph 14.2.2 which applies in a similar manner.

##### 14.16.3 Bulkheads and decks not required to be 'A' Class or 'B' Class divisions

See paragraphs 14.2.3.1 and 14.2.3.2 which apply in a similar manner.

##### 14.16.4 Structure supporting lifeboats and liferafts (L.S. Regulation 86(2)(b))

See paragraph 14.2.4 which applies in a similar manner.

## 14.17 Exterior Boundaries of Superstructures and Deckhouses (L.S. Regulation 88)

### 14.17.1 Insulated boundaries (L.S. Regulation 88(1))

14.17.1.1 Only the exterior boundaries of superstructures and/or deckhouses which enclose accommodation including any overhanging decks supporting such accommodation need be insulated with an A-60 insulation on the portions which face the cargo area and on the side portions for a distance of at least 3 m from the portions which face the cargo area. L.S. Regulation 88(1) does not require the exterior boundaries of superstructures and/or deckhouses which do not enclose accommodation to be insulated. However the inclusion of one or more accommodation space in any position in a superstructure or deckhouse would necessitate it having to be insulated in compliance with that regulation.

14.17.1.2 Each 3 m minimum length of insulated side portion of a superstructure or deckhouse is to be measured horizontally and parallel to the centre line of the ship from the line at which the superstructure or deckhouse ceases to have any forward or aft projection depending on whether the superstructure or deckhouse is aft or forward of the cargo area. This subparagraph as applicable to a deckhouse situated aft of the cargo area is illustrated in figure 14.6.

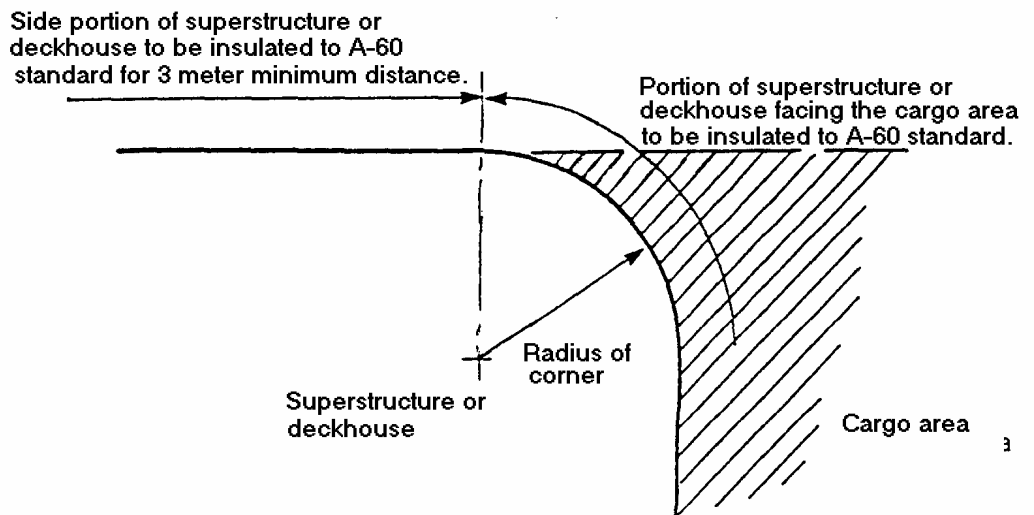


Fig 14.6 Insulated boundaries of superstructure and deckhouses (L.S. Regulation 88(1))

14.17.1.3 The insulation used to insulate the exterior boundaries of superstructures and deckhouses in compliance with L.S. Regulation 88(1) should be an insulation approved for general application in the construction of 'A' Class bulkheads of A-60 standard. The insulation should be fitted deck to

deck in accordance with the conditions indicated in the approval certificate. The insulation need not however be extended for a distance of 380mm along the bulkheads, decks and other internal structure adjacent to the exterior boundaries.

(a) The insulation should be fitted tightly around the window and sidescuttle boxes referred to in paragraph 14.25 but is not required to be fitted inside the boxes. The distance between the windows or sidescuttles and the boxes should be kept to the minimum which will permit the windows or sidescuttles to be maintained or replaced without disturbing the linings or boxes.

(b) Surveyors should note that the insulated boundaries are not 'A' Class divisions.

14.17.1.4 Any overhanging deck supporting accommodation should be insulated for the whole of its length. An overhanging deck would best be insulated on its upperside using an approved A-60 deck covering rather than apply insulation to the underside where it would be exposed to the weather.

14.17.1.5 Any step in the exterior boundaries of superstructures or deckhouses situated aft of the cargo area which is not an overhanging deck, should be insulated from its end nearest the cargo area to at least 3 m aft of the line at which the superstructure or deckhouse under the step ceases to have any forward projection as indicated in paragraph 14.17.1.2. Any similar step in the exterior boundaries of superstructures and deckhouses which enclose accommodation and are situated forward of the cargo area should be treated as a 'mirror image' of the superstructures and deckhouses situated aft of the cargo area. This subparagraph as applicable to a step in the exterior boundaries of deckhouses situated aft of the cargo area is illustrated in figure 14.7.

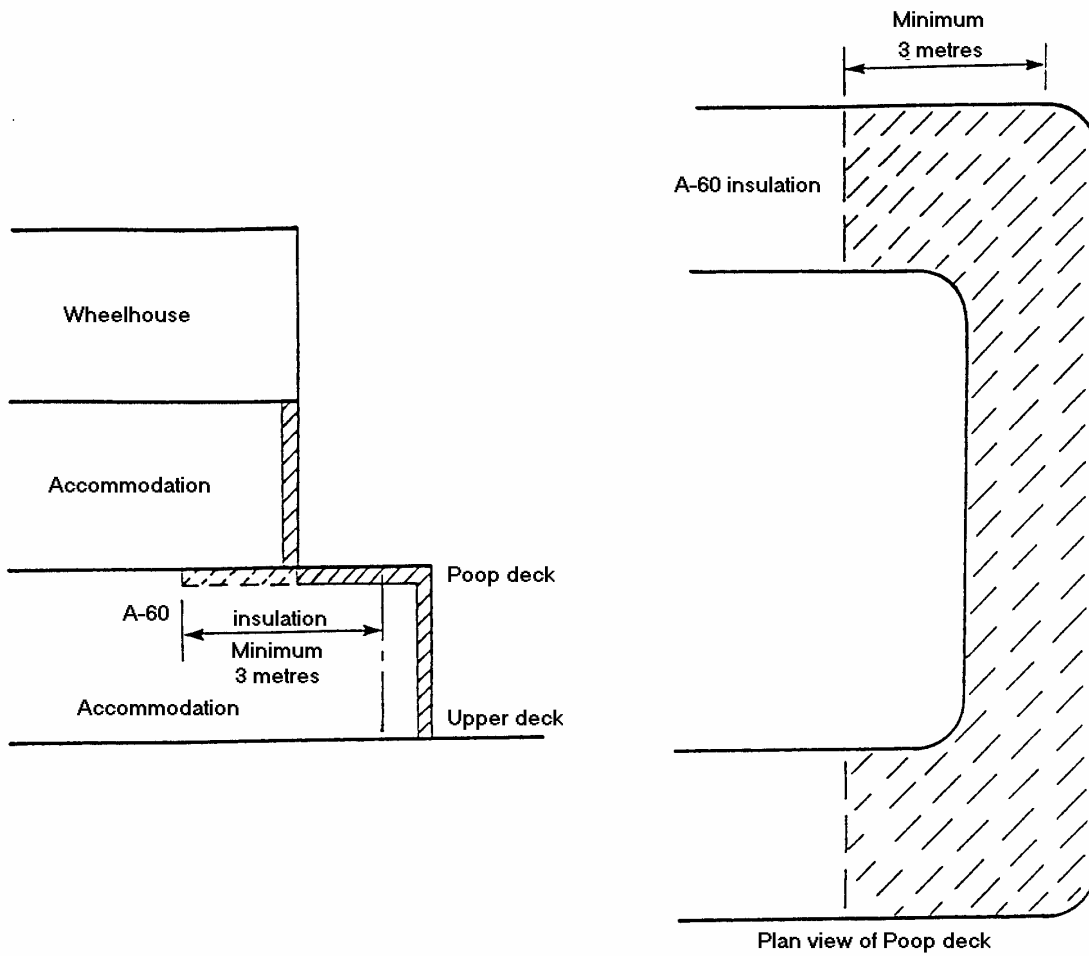
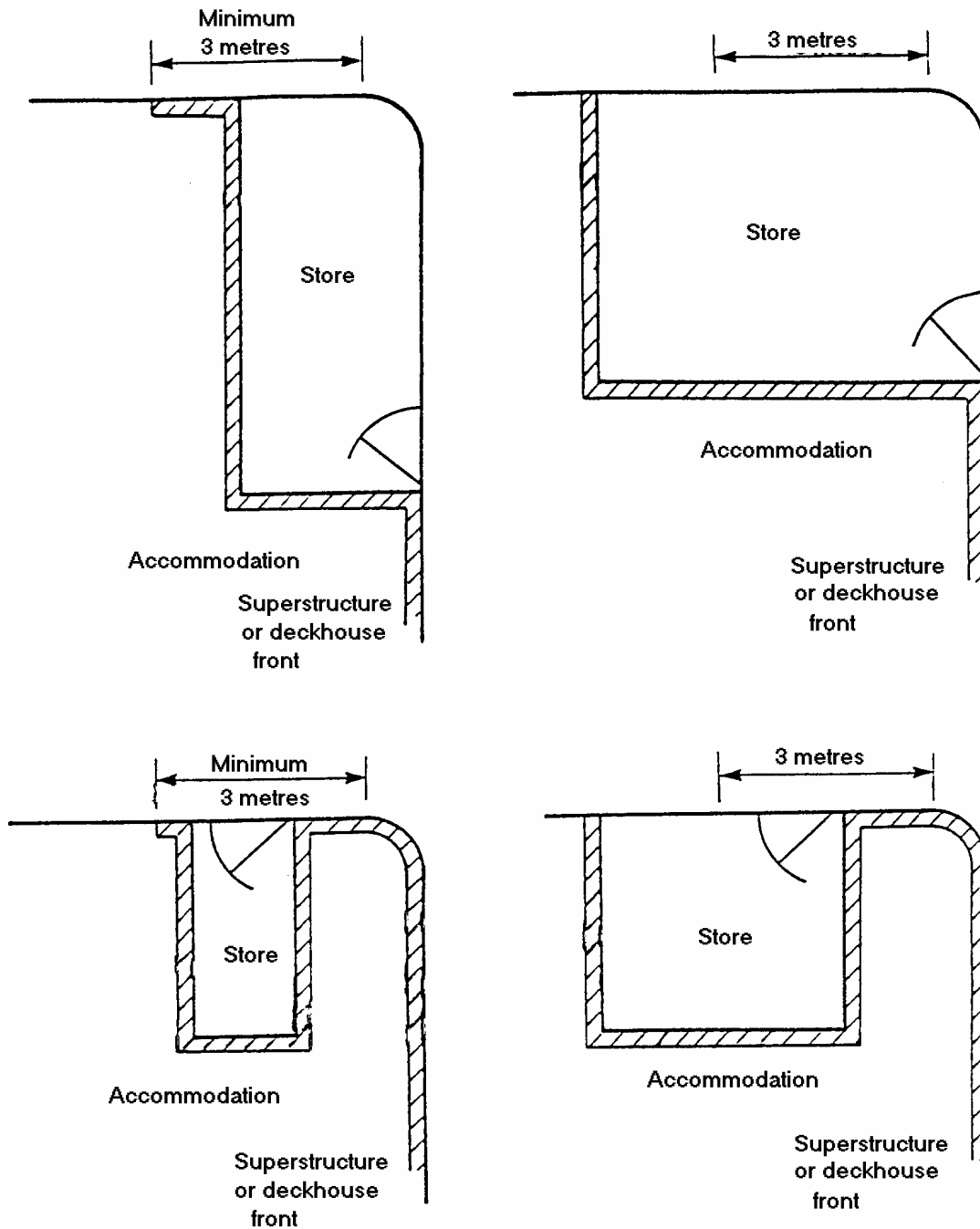


Fig 14.7 Extent of insulation applied to a deck which is not an overhanging deck (L.S. Regulation 88(1))



( In all cases the deckhead of the space should be insulated. )

Fig 14.8 Extent of A-60 insulation around a space having a door which is permitted by L.S. Regulation 88(3) to be fitted within the limits specified in L.S. Regulation 88(2)

14.17.2 Openings (L.S. Regulation 88(2))

The 4% of the length of the ship, referred to in this regulation, should be measured from the line at which the superstructure or deckhouse ceases to have any forward projection when the superstructure or deckhouse is situated aft of the cargo area as illustrated in figure 14.6. When the superstructure or deckhouse is situated forward

of the cargo area, the method of measurement should be a 'mirror image' of that used for a superstructure or deckhouse situated aft of the cargo area.

### 14.17.3 Doors (L.S. Regulation 88(3))

14.17.3.1 L.S. Regulation 88(3) does not permit doors to be fitted in the exterior boundaries of superstructures or deckhouses indicated in L.S. Regulation 88(2), to which paragraph 14.17.2 refers, except doors giving access to cargo control stations, provision rooms or store rooms provided that such a space does not give access to accommodation spaces, service spaces or control stations. The regulation further indicates that when such a door gives access to any such space situated aft of the cargo area, the boundaries of the space, including the deckhead but excluding the boundary facing the cargo area, should be insulated with an A-60 insulation. This requirement should also apply to any such door giving access to cargo control stations, provision rooms or store rooms situated forward of the cargo area in a superstructure or deckhouse enclosing accommodation, even though L.S. Regulation 88(3) may be interpreted as implying that the boundaries of such a space situated forward of the cargo area need not be insulated. The boundaries of such a space situated forward of the cargo area need not be insulated when it is in a superstructure or deckhouse which does not enclose accommodation and the space does not give access to any service space or control station. Furthermore the requirement to insulate the boundaries of a cargo control station, provision room or store room with an A-60 insulation as indicated in L.S. Regulation 88(3) is illogical if applied literally to such spaces situated at the corners or sides of a superstructure or deckhouse and such spaces should be insulated as illustrated in figure 14.8.

14.17.3.2 Surveyors should ensure that when bolted plates for the removal of machinery are fitted in the portions of the exterior boundaries of superstructures and deckhouses referred to in L.S. Regulation 88(2), the plates are insulated with an A-60 insulation in such a manner that the insulation is not likely to be damaged when the plates are removed and replaced. In the circumstances a board type insulation approved for A-60 general application may be less susceptible to damage than any other type of insulation, particularly if it were faced with sheet steel and its edges protected by flats welded to the plates.

### 14.17.4 Gastightness test for the navigation bridge external doors and windows

The navigation bridge external doors and windows which are located within the limits stated in L.S. Regulation 88(2) should be tested for gastightness. If a water hose test is to be used, then the following may be taken as a guide:

- a) nozzle diameter, 12mm;
- b) water pressure just before the nozzle, not less than 2 bar; and

- c) distance between the nozzle and the doors or windows;  
maximum 1.5 m. [unified text]

#### 14.17.5 Windows and sidescuttles (L.S. Regulation 88(4))

14.17.5.1 The frames of windows and sidescuttles situated in the portions of the exterior boundaries of superstructures and deckhouses referred to in L.S. Regulation 88(2) should be constructed of steel and such windows should be fitted with an approved fire resisting glass except that such glass should not be fitted in windows situated in the boundaries of the wheelhouse. The fire resisting glass should be fitted in accordance with the conditions in the approval certificate. Note, the maximum size of window which may be used in association with a fire resisting glass is also stipulated in the approval certificate.

(a) The fire resisting glass should be of a type which has been accepted for use in way of lifeboat, liferaft and marine escape system positions referred to in paragraphs 11.15.2.

(b) Tests have shown that sidescuttles fitted with toughened safety glass in accordance with British Standard MA 24: 1974 are capable of maintaining integrity during a standard fire test and therefore do not need to be fitted with fire resisting glass.

14.17.5.2 When windows are permitted by the Load Line Regulations to be fitted in the first tier of superstructures or deckhouses, such windows which are situated in the portions of the exterior boundaries of the superstructures or deckhouses referred to in L.S. Regulation 88(2) should be provided with covers of steel having a minimum thickness of 1.5mm. When such covers are permanently attached they should be reasonably close fitting over the window frames and be provided with two hinges and at least two swing bolts fitted opposite the hinges. When such covers are portable they should be provided with two handles, be reasonably close fitting over the window frames and the means of securing them should be positive and simple e.g. two slots in each side of the cover engaging 6mm diameter right-angled hooks of suitable length welded to the plating of the superstructure or deckhouse.

14.17.5.3 Steel deadlights permanently attached to sidescuttles and constructed in accordance with BSMA 24: 1974 may be accepted as complying with L.S. Regulation 88(4).

## **14.18 Boundaries of Machinery Spaces of Category A and Pump Rooms (L.S. Regulation 89)**

### **14.18.1 Windows and sidescuttles (L.S. Regulation 89(1))**

The windows and sidescuttles which are permitted by L.S. Regulation 89(1) to be fitted in a bulkhead separating a machinery space of Category A and a machinery control room located within its boundaries are not required to meet any 'A' Class or 'B' Class standard but their construction should be compatible with their size and should be fitted with an approved toughened safety glass.

### **14.18.2 Skylights (L.S. Regulation 89(2))**

Windows and sidescuttles should not be fitted in skylights serving machinery spaces of Category A and pump rooms in compliance with L.S. Regulation 89(2). The skylights should be of substantial construction and capable of preventing the passage of flame and smoke as far as is reasonably practicable.

## **14.19 Bulkheads Within Accommodation Spaces, Service Spaces and Control Stations (L.S. Regulation 90)**

### **14.19.1 General comment (L.S. Regulation 90(1))**

All bulkheads within accommodation spaces, service spaces and control stations are required to be 'A' Class, 'B' Class or 'C' Class divisions as indicated in table 3 of Schedule 2 to MSN 1668(M). These divisions should be constructed and insulated as indicated in paragraph 11.2.1 and paragraph 11.3 in the case of 'A' Class divisions; paragraph 11.2.2 and 11.7 in the case of 'B' Class divisions and paragraph 11.11 in the case of 'C' Class divisions.

### **14.19.2 'B' Class divisions (L.S. Regulation 90(2))**

See paragraph 14.4.1 which applies in a similar manner.

## **14.20 Fire Integrity of Bulkheads and Decks (L.S. Regulation 91)**

### **14.20.1 Minimum standards and categories**

Each space throughout the ship should be allocated a category from the list of categories ((1) to (10) inclusive) indicated in Schedule 2 to MSN 1668(M). The minimum fire integrity and insulation standards of the bulkheads or decks separating adjacent spaces should be determined by cross referencing the categories of the spaces in the appropriate table in Schedule 2.

#### 14.20.2 Group of spaces

See paragraph 12.5.2 which applies in a similar manner.

#### 14.20.3 Separating spaces with partial bulkheads, and enclosed promenades

See paragraph 12.5.3 which applies in a similar manner.

#### 14.20.4 Insulation values of spaces with special characters of two of more space categories and separating by wire mesh.

See paragraph 14.5.4. which applies in a similar manner.

#### 14.20.5 Doubt as to category of a space

See paragraph 12.5.5 which applies in a similar manner.

#### 14.20.6 Spaces used for unrelated purposes

See paragraph 14.5.6 which applies in a similar manner.

#### 14.20.7 Spaces of more than one category

See paragraph 14.5.7 which applies in a similar manner.

#### 14.20.8 Stairways closed at one level and escape trunks

See paragraph 14.5.8 which applies in a similar manner.

#### 14.20.9 Category of enclosed emergency escape trunks

See paragraph 14.5.9 which applies in a similar manner.

#### 14.20.10 Category of electrical equipment rooms

See paragraph 14.5.10 which applies in a similar manner.

#### 14.20.11 Construction and arrangement of saunas

See paragraph 14.5.12 which applies in a similar manner.

#### 14.20.12 Pantries containing no cooking appliances

See paragraph 14.5.13 which applies in a similar manner.

#### 14.20.13 Separation of machinery spaces from other spaces

See paragraph 14.5.14 which applies in a similar manner.

14.20.14 Continuous 'B' Class ceilings or linings as 'A' Class insulations (paragraph 1(10)(c) of Schedule 2 to MSN 1668(M))

See paragraph 14.5.15 which applies in a similar manner.

14.20.15 External boundaries (paragraph 1(d) of Schedule 2 to MSN 1668(M)).

14.20.15.1 *Windows and sidescuttles*

The outer boundaries of the hull, superstructure and deckhouses may be pierced by windows and sidescuttles which are not required to meet any 'A' Class or 'B' Class standard except that windows and sidescuttles situated in the portions of exterior boundaries of superstructures and deckhouses referred to in L.S. Regulation 88(2) should comply with paragraph 14.17.5. Furthermore surveyors should recommend to shipbuilders and owners that any windows which are fitted in superstructures or deckhouses within 3m of the lifeboat and liferaft embarkation, stowage, handling and lowering positions should be fitted with an approved fire resisting glass. The glass to be fitted in accordance with the conditions stated in the approval certificate. This recommendation does not apply to windows fitted in a superstructure or deckhouse situated on any deck above the highest deck on which the lifeboat, liferaft or marine escape system positions are situated. See paragraph 11.15.2.

14.20.15.2 *Doors*

(a) Doors in the outer boundaries of superstructures and deckhouses may be of any material or construction subject to compliance with any load line requirements. However any such doors which are within 3 m of the lifeboat and liferaft embarkation, stowage, handling and lowering positions should be of substantial steel construction except that any such door giving access to accommodation spaces may be of solid wood construction.

(b) See paragraph 14.17.3 regarding the restrictions imposed by L.S. Regulation 88(3) on the fitting of doors in the portions of the exterior boundaries of superstructures and deckhouses referred to in L.S. Regulation 88(2).

(c) 'A' Class door assemblies designed for interior use may not be suitable for use in external positions exposed to the weather because of their light construction and susceptibility to corrosion.

14.20.16 Lighting enclosures for illuminating cargo pump rooms (paragraph 1(e) of Schedule 2 to MSN 1668(M))

14.20.16.1 When light enclosures are intended to be fitted in boundary bulkheads and decks of cargo pump rooms details of their construction should be submitted to Headquarters for consideration and approval.

14.20.16.2 Electric cable transits which have been approved for use in watertight 'A' Class divisions should be used when the cables to the light enclosures pass through such boundary bulkheads and decks. See paragraphs 11.5.1 and 11.5.2

14.20.17 Boundaries and intersections (paragraph 1(f) of Schedule 2 to MSN 1668(M))

See paragraph 14.5.17 which applies in a similar manner.

14.20.18 Superscriptions in tables 3 and 4 (paragraph 1(g) of Schedule 2 to MSN 1668(M))

14.20.18.1 *Superscription 'a'*

Where superscription 'a' appears in table 3, the A-0 standard or B-0 standard applies to the bulkheads which are required to enclose stairways and lifts as indicated in L.S. Regulation 92. See paragraph 14.21.1.

14.20.18.2 *Superscription 'b'*

(a) Where superscription 'b' appears in tables 3 and 4, the A-0 standard only applies to bulkheads and decks separating spaces which are used for different purposes e.g. in Category (9) in table 3, a bulkhead separating a galley and a paint room. A bulkhead or deck need not be fitted between two spaces used for the same or similar purposes e.g. two machinery spaces of other than Category A. However, if a shipbuilder decides to fit a bulkhead between two such spaces, the bulkhead need only be of steel having no fire integrity standard or may be of expanded metal.

(b) Similarly in Category (9) in table 3, a bulkhead need not be fitted between two storerooms having areas in excess of 2 m which are used for the same purpose or, if a bulkhead is fitted, it need have no fire integrity standard e.g. two provision storerooms. However the bulkhead separating two storerooms used for different purposes e.g. linen and provision storerooms should be of A-0 standard as specified in table 3.

14.20.18.3 *Superscription 'c'*

Bulkheads separating control stations are required by table 3 to be of A-0 standard except that bulkheads separating the wheelhouse, chartroom and radio office may be of B-0 standard.

14.20.18.4 *Superscription 'e'*

Where a superscription 'e' appears in table 4 the A-60 insulation need not be fitted to a deck separating a machinery space of Category A and a space containing either:

- (a) auxiliary machinery not having a pressure lubricating system and not having any combustibles stowed in the space;
- (b) ventilation and air conditioning machinery; or
- (c) switchboards and major electrical equipment except oil-filled electrical transformers above 10 KVA and switchboards and electrical equipment used for emergency purposes.

This relaxation does not apply to spaces containing minor electrical equipment such as section switchboards, fuse boxes and junction boxes.

14.20.19 Asterisk in the tables (paragraph 1(g) of Schedule 2 to MSN 1668(M))

14.20.19.1 Where an asterisk appears in tables 3 and 4, the bulkheads and decks are required to be of steel or equivalent material but need have no 'A' Class standard except that the crowns and casings of machinery spaces of Category A and the exterior boundaries of superstructures and deckhouses which are required to be insulated with an A-60 insulation in compliance with L.S. Regulation 88(1) are required by L.S. Regulation 86(1) to be constructed only of steel. However, where such a deck, except an open deck, is penetrated for the passage of electric cables, pipes and vent ducts such penetrations should be made tight to prevent the passage of flame and smoke. **[unified text]** When such bulkheads and decks are constructed of aluminium alloy then paragraph 14.16. should apply.

14.20.19.2 Notwithstanding the provision of an asterisk in the tables, any of the following structure which is constructed of aluminium alloy should be an 'A' Class division of A-0 standard:

- (a) any part of the hull or sides of a superstructure or deckhouse which does not support the lifeboat and liferaft embarkation, stowage, handling and lowering positions but is within 3 m of such positions; and

(b) the ends and sides of any superstructure or deckhouse which overlook a deck, walkway or stairway which may be used as an escape route from accommodation spaces, service spaces, control stations or machinery spaces to the lifeboat or liferaft embarkation deck, the superstructure or deckhouse not being one which supports the lifeboat and liferaft embarkation, stowage, handling and lowering positions.

## 14.21 Protection of Stairways and Lifts (L.S. Regulation 92)

### 14.21.1 Construction and insulation (Regulation 92(1))

14.21.1.1 The stiles, treads, risers and if fitted backing plates, of stairways should be constructed of steel except that they may be constructed of aluminium alloy suitably insulated when the structure is of aluminium alloy.

14.21.1.2 Every stairway and lift is required by L.S. Regulation 92(1) to lie within an enclosure or trunk constructed of 'A' Class divisions of A0 standard except that an isolated stairway serving only two decks need only be enclosed at one level by 'A' Class divisions of A0 standard or 'B' Class divisions of B-0 standard. However when a stairway abuts a machinery space of Category A or a cargo pump room, the bulkhead or deck separating the stairway from the machinery space or cargo pump room is to be determined respectively by reference to tables 3 or 4 in Schedule 2 to MSN 1668(M).

14.21.1.3 Figure 14.4 shows three methods of enclosing stairways on tankers when the stairways serve more than two decks.

(a) The arrangement shown in figure 14.4(a), however, provides a much safer means of escape and access for fire parties than the arrangements in figures 14.4(b) and (c) should the corridors become filled with smoke. Furthermore the arrangement shown in figure 14.4(a) imposes no more restrictions on the accommodation layout than the other two arrangements as can be seen by comparing the plan views in figure 14.5.

(b) Shipbuilders and shipowners should be recommended by surveyors to incorporate the arrangement shown in figure 14.4(a) in accommodation layouts whenever possible.

(c) When it is not possible to arrange a stairway enclosure as indicated in figure 14.4(a) then the arrangement shown in figure 14.4(b) is preferred to that shown in figure 14.4(c). Furthermore the arrangement shown in figure 14.4(b) could be improved by fitting flush hatches with hinged steel covers in the landings marked 'X' on the drawing and vertical ladders in the 'tweendecks' marked 'Y'. This improvement would permit a person entering the stairway enclosures at any level to proceed to any other level without having to leave the enclosures.

14.21.1.2 Stairway enclosures and lift trunks constructed of steel which are required by the tables in Schedule 2 to MSN 1668(M) to be insulated, may be insulated on either side but in any case measures should be taken to prevent heat transmission through divisions in way of decks, landings etc.

#### 14.21.2 Openings in stairway enclosures (L.S. Regulation 92(2))

See paragraph 14.6.2 which applies in a similar manner.

#### 14.21.3 Access into stairway enclosures

See paragraph 14.6.3 which applies in a similar manner.

#### 14.21.4 Openings in lift trunks (L.S. Regulation 92(2))

Openings in lift trunks should be fitted with approved doors of the same 'A' Class standard as the bulkhead in which they are fitted except for any opening provided with a door which is not required to meet any 'A' Class standard as indicated in paragraph 14.21.5.

#### 14.21.5 Lift trunks in stairway enclosures

The boundaries and doors of a lift trunk which is situated within a stairway enclosure are not required to meet any 'A' Class standard provided that:

- (a) any boundary of the lift trunk which forms part of the stairway enclosure is an 'A' Class division of the appropriate standard specified in the tables in Schedule 2 to MSN 1668(M); and
- (b) any opening in the lift trunk which gives direct access to any space situated outside the enclosure is provided with an approved lift door of the same 'A' Class standard as the bulkhead in which it is fitted.

A lift trunk which extends above or below a stairway enclosure may be treated in the same manner.

### **14.22 Openings in 'A' Class Divisions (L.S. Regulation 93)**

See paragraph 14.7 which applies in a similar manner.

### **14.23 Openings in 'B' Class Divisions (L.S. Regulation 94)**

See paragraph 14.8 which applies in a similar manner.

## 14.24 Ventilation Systems (L.S. Regulation 95 and Schedule 3 to MSN 1668(M))

### 14.24.1 General comment

14.24.1.1 The ventilation systems serving the following spaces should be independent of accommodation spaces, service spaces and control stations and should be independent of each other:

- (a) a stairway enclosure;
- (b) a galley or galley complex; and
- (c) a machinery space or group of machinery spaces.

14.24.1.2 The ducting of a ventilation system serving a space or group of spaces fitted with a fixed gas fire extinguishing system should be of steel and of 'A' Class and gastight construction where it passes through a space not served by the extinguishing system.

14.24.1.6 The ventilation system serving a space in which gas cylinders are stored should not serve or pass through any other space and should be capable of freeing the space of any gas which may leak from the cylinders.

### 14.24.2 Smoke control

See paragraph 14.9.2 which applies in a similar manner.

### 14.24.3 Vertical ducts

See paragraph 14.9.3 which applies in a similar manner.

### 14.24.4 Air supply to control stations

See paragraph 14.9.4 which applies in a similar manner.

### 14.24.5 Ducts from machinery spaces of Category A, galleys etc.

See paragraph 14.9.5 which applies in a similar manner.

### 14.24.6 Ducts from accommodation spaces etc.

See paragraph 14.9.6 which applies in a similar manner.

### 14.24.7 Galley exhaust ducts (Regulation 136(7))

See paragraph 14.9.7 which applies in a similar manner.

### 14.24.8 Openings for recirculating or exhausting air or balancing systems

See paragraph 14.9.8 which applies in a similar manner.

#### 14.24.9 Ducts passing through 'A' Class divisions

See paragraph 12.9.11 which applies in a similar manner.

#### 14.24.10 Fire resisting ducts

See paragraph 12.9.12 which applies in a similar manner.

#### 14.24.11 Ducts passing through 'B' Class divisions

See paragraph 12.9.13 which applies in a similar manner.

#### 14.24.12 Fire dampers

See paragraph 12.9.14 which applies in a similar manner.

### **14.25 Details of Construction (L.S. Regulation 96)**

14.25.1 L.S. Regulation 96 requires ceilings, linings, draught stops and their associated grounds in accommodation spaces, service spaces and control stations to be non-combustible. Consequently any ceiling or lining which is neither the insulating medium for an 'A' Class division, nor a 'B' Class division, should be of 'C' Class standard i.e. constructed of non-combustible materials but having no fire integrity and insulation standards. 'C' Class divisions should be constructed as indicated in paragraph 11.11.

14.25.2 The construction of window and sidescuttle boxes should be compatible with the standards of the linings in which they are fitted. See paragraph 11.12 and paragraph 14.17.1.3.

14.25.3 Draught stops should be constructed as indicated in paragraph 12.11.6.3. See also paragraph 14.12.6.

### **14.26 Restriction of Combustible Materials (L.S. Regulation 97)**

See paragraph 14.11 which applies in a similar manner.

### **14.27 Miscellaneous Items of Fire Protection (L.S. Regulation 98)**

See paragraph 14.12 which applies in a similar manner.

#### **14.28 Smoke Detectors (L.S. Regulation 99)**

In the case of stairways serving more than two decks, a smoke detector should be fitted under each deck or landing.

#### **14.29 Special Arrangements for Machinery Spaces (L.S. Regulation 100)**

See paragraph 14.14 which applies in a similar manner.

#### **14.30 Protection of Lifeboat and Liferaft Positions**

Means should be provided to protect, as far as is practicable, lifeboat and liferaft stowage, handling and embarkation positions from fire and explosion in the cargo area in compliance with Regulation 16(1)(e) of the Merchant Shipping (Life Saving Appliances) Regulations 1986, Statutory Instrument 1986 No 1066. Details of the shipbuilders' or shipowners' proposals for compliance with this regulation should be submitted to Headquarters for consideration.