

CHAPTER 12

PASSENGER SHIPS OF CLASSES I, II AND II(A)(OF 21.34 M IN LENGTH AND OVER) CARRYING MORE THAN 36 PASSENGERS (L.S. REGULATIONS 51 TO 67)

12.1 Structure (L.S. Regulation 52(1))

12.1.1 Hinged or portable decks

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

12.1.2 False decks

False decks should be constructed of steel or equivalent material except that small areas used for dancing in dining rooms may be constructed of wood which should be included in the total volume of combustibles referred to in L.S. Regulation 62(2)(a). 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 12.11.2.1.

12.2 Aluminium Alloy Structure (L.S. Regulation 52(2))

12.2.1 Insulating the structure

Tables 1 to 6 of Schedule 1 to MSN 1667(M) - L.S. Regulation 56 refers, require all bulkheads and decks to be 'A' Class or 'B' Class divisions except for those decks referred to in paragraph 12.5.14 and a limited number of bulkheads in table 2 and 5 which are permitted to be 'C' Class divisions. Consequently all aluminium alloy bulkheads and decks including the ships side and boundaries of superstructures and deckhouses, except for the decks referred to in paragraph 12.5.14 and 'C' Class bulkheads, 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 and 30 minutes duration in the case of 'A' Class and 'B' Class divisions respectively. See also paragraphs 11.2.1.4, 11.2.2.2, 12.5.14 and 12.5.15.

12.2.2 Approved insulations

Approved materials 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 or '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.

12.2.3 'C' Class bulkheads

12.2.3.1 Any 'C' Class bulkheads constructed of aluminium alloy which are structural bulkheads supporting 'A' Class or 'B' Class decks 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 for the same periods as required for the divisions which they are supporting.

12.2.3.2 However where 'C' Class bulkheads constructed of aluminium alloy support a deck, parts of which are 'A' Class and 'B' Class divisions then the bulkheads should be insulated in the same manner as an aluminium alloy 'A' Class bulkhead of A-0 standard.

12.2.4 Structure supporting lifeboats and liferafts (L.S. Regulation 52(2)(b))

Notwithstanding paragraphs 12.2.1 and 12.2.3 any aluminium alloy structure which supports the lifeboat, liferaft and marine escape system embarkation, stowage, handling and lowering positions is required by L.S. Regulation 52(2)(b) 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.

12.3 Main Vertical Zones and Horizontal Zones (L.S. Regulation 54)

12.3.1 Continuity of bulkheads

Surveyors should ensure that the continuity of main vertical zone bulkheads above and below a horizontal zone is maintained through any casings or other spaces which are situated within the same 'tween deck as the horizontal zone.

12.3.2 Impairment of main zone bulkheads

Surveyors should ensure that stairway enclosures, lift trunks or trunks for any other purposes do not impair main vertical zone bulkheads when the bulkheads are stepped or when a main vertical zone is divided horizontally in accordance with L.S. Regulation 54(3). See also paragraph 12.6.2.

12.3.3 Spaces used for the carriage of trains (L.S. Regulation 54(4))

For the purpose of compliance with L.S. Regulation 54(4) the boundary bulkheads and decks of any 'tween deck which is used for the carriage of trains incorporating passenger carriages with or without freight rolling stock should be treated in the same manner as the boundary bulkheads and decks of a special category space.

12.4 Bulkheads Within Main Vertical Zones (L.S. Regulation 55)

12.4.1 Fire integrity and insulation standards of bulkheads (L.S. Regulation 55(1))

All bulkheads within accommodation spaces and service spaces are required to be 'A' Class, 'B' Class or 'C' Class divisions as indicated in the tables in Schedule 1 to MSN 1667(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.

12.4.2 Corridor bulkheads (L.S. Regulation 55(2)(a))

As an alternative to the requirements of L.S. Regulation 55(2), corridor bulkheads may be fitted in accordance with the arrangements agreed internationally and shown in MSC/Circ.699, i.e. as illustrated in figures 12.1 and 12.2. **[unified text]** (The adoption of these alternative arrangements does not in any way dispense with the need to fit draught stops, paragraphs 12.11.6.3 and 12.12.5 refer).

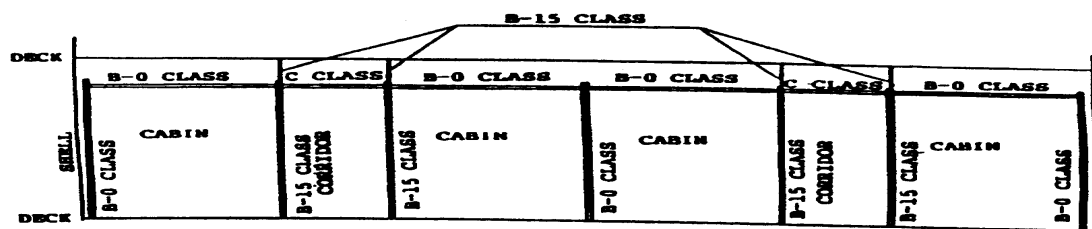


Figure 12.1 Fire integrity of bulkheads and ceilings in accommodation spaces

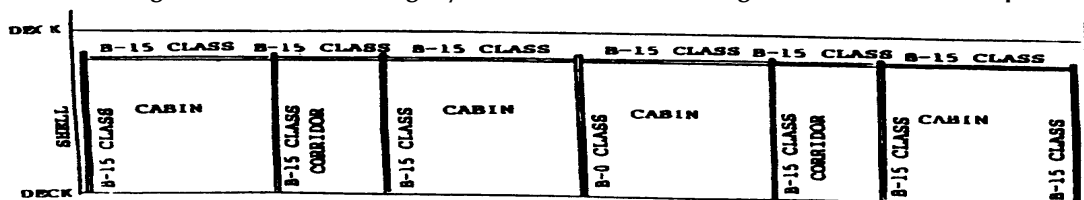


Figure 12.2 Fire integrity of bulkheads and ceilings in accommodation

12.5 Fire Integrity of Bulkheads and Decks (L.S. Regulation 56)

12.5.1 Minimum standards and categories

Each space throughout the ship should be allocated a category from the list of Categories ((1) to (14)) inclusive indicated in paragraph 1(b) of Schedule 1 to MSN 1667(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.

12.5.2 Group of spaces

A group of spaces which are used for different purposes should not be treated as a single space with its boundary divisions having the most stringent fire standards appropriate to the boundary divisions of any space within the group and apply no fire standards to the internal bulkheads separating the spaces within the group. This restriction does not apply to any groups of spaces specifically referred to in the regulations such as galleys and their annexes, refrigerated chambers or a cabin and private sanitary facilities.

12.5.3 Separating spaces with partial bulkheads and enclosed promenades

If a space is divided into two (or more) smaller spaces so that these new spaces form enclosed spaces (e.g. a cabinet built in a restaurant, a store room built in a restaurant), then these new enclosed spaces should be surrounded by fire resistant bulkheads and decks of the appropriate standard. **[unified text]**

Enclosed promenades should have no significant fire risk, meaning that furnishings should be restricted to deck furniture. In addition, such spaces should be naturally ventilated by permanent openings. **[unified text]**

12.5.4 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.

e.g. the fire insulation values of the divisions of emergency generator rooms in passenger ships carrying more than 36 passengers should be the highest value for the space when the space is considered being a control station (Category (1)) and a machinery space (Category (11) or (12)). **[unified text]**

A separation made by wire mesh between two portions of a space is not considered a division when applying to this requirement **[unified text]**.

12.5.5 Doubt as to category of a space

Where there is doubt as to which category should be allocated to a particular space, the surveyor should submit details of the contents of the space and the purpose for which the space is to be used to Headquarters for consideration.

12.5.6 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 (13)) and a ventilation room (Category (10)). It is inappropriate 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.

12.5.7 Spaces of 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 (11) or (12) whichever is applicable) then the category which should be used is the one which requires the more stringent fire integrity and insulation standard for the bulkhead or deck which separates the space from an adjacent space.

12.5.8 Stairways closed at one level and escape trunks

A stairway or an escape trunk which is closed at only one level, (other than one which forms a continuous fire shelter from the lower part of a machinery space referred to in L.S. Regulation 68(5)(a)(i)) 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 (2) space. The category of the 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 (see paragraph 12.6.7).

12.5.9 Enclosed emergency escape trunks

A totally enclosed emergency escape trunk belongs to the space Category (2). **[unified text]**

12.5.10 Sales shops

Sales shops are included in Category (7) and may be used for the sale of any commodities including those which have a flammable content such as spirits, perfumes, hair sprays, lighter fuel etc.

12.5.11 Pantries containing no cooking appliances

12.5.11.1A pantry in Category (9) may contain coffee automats, toasters, dish washers, microwave ovens, water boilers and similar appliances each with a maximum power of 5kw. They may also contain electrically heated cooking plates and hot plates for keeping food warm each with a maximum power of 2kw and a surface temperature not above 150°C. (Note a dining room containing the appliances mentioned above should not be regarded as a pantry). **[unified text]**

12.5.11.2The position of power sockets should be such that when heat producing appliances such as toasters are plugged into them the appliances are clear of curtains, towel rails etc.

12.5.11.3A microwave oven may be included in a pantry containing no cooking appliances subject to the following conditions:

- (a) the oven should comply with the latest relevant standards as indicated in the 'Survey of Crew Accommodation in Merchant Ships-Instructions for the Guidance of Surveyors;
- (b) the oven should be suitable for the maximum ambient temperature which will be encountered in the space in which it is to be fitted;
- (c) the oven should be fitted with a thermal protective device arranged to interrupt the electrical supply to the oven in the event of overheating e.g. should the timer fail to operate;
- (d) a permanent notice should be displayed adjacent to each oven stating that the oven must not be operated if the door interlock is not operating, the door is damaged or ill-fitting or the door seals are damaged; and
- (e) the oven should be tested periodically in service for radiation leakage to ensure that the leakage levels do not exceed those allowed by the standards referred to in (a) above. Such tests should be carried out by a person having the necessary specialist experience and equipment.

12.5.12 Diet kitchens

Diet kitchens (containing no open flame) should be in compliance with the interpretations for pantries of Category (9). **[unified text]**

12.5.13 Main pantries, pantries containing cooking appliances and galleys

Main pantries and pantries containing cooking appliances may contain:

- (a) coffee automats, toasters, dish washers, microwave ovens, water boilers and similar appliances each of them with a power of more than 5 kW;
- (b) electrically heated cooking plates and hot plates for keeping food warm each of them with a maximum power of 5 kW.

Spaces containing any electrically heated cooking plate or hot plates for keeping food warm with a maximum power of more than 5 kW should be regarded as galleys. **[unified text]**

12.5.14 Construction and arrangement of saunas

- (a) A sauna is a hot room where the heat of that space is provided with a hot surface (e.g. an electrically heated oven). The term 'sauna' means here the space where the oven is located, and it may

also include the bath room. The temperature in the sauna is normally between 80 - 120°C.

(b) The perimeter of the sauna should be of A Class boundaries and may include changing rooms, showers and toilets. The hot room should be insulated to A-60 standard against other spaces except those inside of the perimeter and spaces of Categories (5), (9) and (10).

(c) The bath room which has direct access to the sauna (hot room) may be considered as a part of the sauna (hot room). In such a case, there are no safety requirements which apply to the door between the sauna (hot room) and the bath room.

(d) The traditional wooden lining on the bulkheads and ceiling are permitted in the sauna. The ceiling above the oven should be lined with a non-combustible plate with an air gap of at least 30mm. The distance from the hot surfaces to the combustible materials should be at least 500mm or the combustible materials should be protected (e.g. with a non-combustible plate with an air gap of at least 30mm).

(e) The traditional wooden benches are permitted to be used in the sauna.

(f) The sauna door should open outwards by pushing.

(g) An electrically heated oven should be provided with a timer.
[unified text]

12.5.15 Separation of machinery spaces from other spaces

12.5.15.1 Any insulated bulkhead or deck which separates any machinery space from any other space should not be substituted by a cofferdam formed by uninsulated bulkheads or decks even though the arrangement would theoretically satisfy the regulations by treating the cofferdam as an intervening void space. A cofferdam does not provide the same degree of protection as an insulated division.

12.5.15.2 This should also apply to any arrangement involving a false deck (see paragraph 12.1.2).

12.5.16 Auxiliary machinery spaces in which combustibles are stowed

Category (11) includes auxiliary machinery spaces specified in Category (10) in which combustibles are permitted to be stowed. Such combustibles should only be those which are to be used in the machinery spaces and workshops such as boxed or crated spares, staging planks, wooden shores and wedges, cartons or boxes containing cleaning materials, rags and hand cleansers, tins or drums of grease etc.

12.5.17 Superscription 'a' in the tables in Schedule 1 to MSN 1667(M)

12.5.17.1 When adjacent spaces are in the same numerical category and a superscription 'a' appears in the table and the spaces are used for the same purpose, a bulkhead or deck need not be fitted between the spaces e.g. in Category (12), table 2 of Schedule 1 to MSN 1667(M) two machinery spaces of Category A adjacent to each other. If a bulkhead is fitted between two such spaces the bulkhead need only be of steel having no fire integrity standard or may be of expanded metal.

12.5.17.2 Although a galley and a machinery space of Category A are in the same numerical category they are used for different purposes and therefore a bulkhead of A-0 standard should be fitted between them as indicated in table 2.

12.5.17.3 Similarly in Category (13), table 2 a bulkhead need not be fitted between two storerooms which are used for the same purpose or, if a bulkhead is fitted, it need have no fire integrity standard e.g. two linen 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 2.

12.5.18 Internal bulkheads of refrigerated chambers

The internal bulkheads of refrigerated chambers (Category (11)) including the bulkhead between the storerooms and the handling room need not meet any fire integrity standard provided that the handling room is included in the chambers when obtaining the fire integrity and insulation standards of the boundary divisions from the tables. See paragraph 12.11.6.4 for refrigerated chambers insulated with organic foams, cork or other flammable materials (see also paragraph 11.17).

12.5.19 Ends and sides of superstructures and deckhouses (L.S. Regulation 56(1))

12.5.19.1 The A-0 and B-0 standards specified in tables 1, 2 and 5 of Schedule 1 to MSN 1667(M) need not apply to the ends of superstructures or deckhouses constructed of steel which overlook open deck spaces (Category (5)). This relaxation may also apply to the sides of superstructures and deckhouses constructed of steel which are at least 3 m clear longitudinally of the lifeboat, liferaft and marine escape system embarkation, stowage, handling and lowering positions and similarly clear of any deck which is used for transferring passengers or crew from a muster station to an embarkation deck.

12.5.19.2 The relaxation should not apply to the ends of sides of superstructures or deckhouses constructed of aluminium alloy.

12.5.19.3 The sides of superstructures or deckhouses constructed of steel or aluminium alloy which are within 3 m longitudinally of the lifeboat, liferaft and marine escape system embarkation, stowage, handling and lowering positions and are similarly in way of any deck which is used for transferring passengers or crew from a muster station to an embarkation deck should be treated as though they are overlooking Category (4) spaces.

12.5.20 Fire standards for weatherdecks (L.S. Regulation 56(1))

12.5.20.1 The A-0 and B-0 standards specified in tables 3, 4 and 6 of Schedule 1 to MSN 1667(M) need not apply to decks constructed of steel which have open deck spaces (Category (5)) above and/or below them.

12.5.20.2 The relaxation should apply only to decks constructed of aluminium alloy which have open deck spaces (Category (5)) above and below them or only below them.

12.5.20.3 Any deck which has only an open deck space above it and the deck is used for transferring passengers or crew from a muster station to an embarkation deck should be treated as a deck under a Category (4) space.

12.5.21 Continuous 'B' Class ceilings or linings as 'A' Class insulations

12.5.21.1 A continuous 'B' Class ceiling or lining should only be used respectively as the insulating medium for 'A' Class decks or bulkheads when the boards or panels from which the ceiling or lining is constructed have been approved for such use and a certificate issued. The ceiling or lining should be constructed in accordance with the conditions indicated on the approval certificate.

12.5.21.2 When used for this purpose, ceilings should terminate on or be continued to adjacent 'A' Class bulkheads, ship side or deckhouse side. Such divisions will therefore define the horizontal extent of the insulation 'A' Class deck. Where the ceiling void is bounded by A-0 bulkheads, the portions of these bulkheads above ceiling level should be insulated to the same standard as the ceiling.

12.5.21.3 See paragraphs 11.3.1 and 11.3.2.

12.5.22 Boundaries and intersections of 'A' Class divisions

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

12.6 Protection of Stairways (L.S. Regulation 57)

12.6.1 Construction and insulation

12.6.1.1 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. Stairway enclosures constructed of steel which are required by the tables in Schedule 1 to MSN 1667(M) to be insulated, may be insulated on either side but when the enclosures are insulated on the inside, measures should be taken to prevent heat transmission through the divisions in way of decks, landings etc.

12.6.1.2 See paragraphs 15.2.2, 15.3.1 and 15.6.1 for further information relating to stairways.

12.6.2 Stairways penetrating main zone steps

When a stairway enclosure penetrates a step in a main zone bulkhead, the bulkheads and decks forming the enclosure which project above or below the step should be regarded as main zone divisions and tables 1 and 3 of Schedule 1 to MSN 1667(M) used to determine their fire integrity and insulation standards and any penetrations through such bulkheads and decks should be treated accordingly.

12.6.3 Stairways serving two decks (L.S. Regulation 57(1)(a))

The enclosure bulkheads surrounding a stairway serving only two decks should be insulated where necessary with an insulation approved for 'A' Class bulkheads having the same 'A' Class standard of the deck which is penetrated by the stairway.

12.6.4 Stairways in public rooms (L.S. Regulation 57(1)(b))

A stairway which lies wholly within a public room e.g. one which links the main part of a dining room with a raised part or balcony, need not be enclosed.

12.6.5 Lift trunks in stairway enclosures

12.6.5.1 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 the tables of Schedule 1 to MSN 1667(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.

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

12.6.6 Means of closure (L.S. Regulation 57(3))

Door openings in lift trunks should be fitted with efficient doors. Where the opening occurs in an area of the trunk which forms an 'A' Class division, then the door should be of an approved type of the same 'A' Class standard or greater.

12.6.7 Stairway enclosures-stowage of equipment (L.S. Regulation 57(4) and (6))

Safety equipment which may be hazardous (e.g. rockets) should not be accepted for storage in stairway enclosures.

12.7 Openings in 'A' Class Divisions (L.S. Regulation 58)

12.7.1 General comment

12.7.1.1 When an 'A' Class division is intersected 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 or penetration.

12.7.1.2 Structural intersections should be dealt with in the case of insulated divisions by continuing the insulation along such structure as indicated in paragraph 11.2.1.5.

12.7.1.3 Pipes and cables penetrating 'A' Class divisions should be dealt with as indicated in paragraphs 11.4 and 11.5 respectively. Ventilation ducting which penetrates 'A' Class divisions should be dealt with as indicated in paragraph 12.9.

12.7.2 Hatches (L.S. Regulation 58(3))

12.7.2.1 A hatch in a deck separating special category spaces and/or Ro-Ro cargo spaces which are in the same horizontal zone is not required to have any fire standard.

12.7.2.2 However a hatch in a deck separating such spaces which are in different horizontal zones should be constructed and insulated to the required 'A' Class standard. The construction and insulation of such a hatch and of a hatch fitted in any other deck of 'A' Class standard should be such that the integrity of the deck would not be impaired if subjected to a standard fire test for 60 minutes duration.

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

12.7.3 Watertight doors (L.S. Regulation 58(4))

The watertight doors referred to in this regulation are sliding doors fitted below the bulkhead deck. Such doors need not be fire tested, and may be fitted with hard rubber or neoprene seals provided no part of the seals is exposed when the door is closed. The doors should be designed to remain substantially watertight if such seals were to become heat damaged.

12.7.4 Doors and shutters (L.S. Regulation 58(4) to (8))

12.7.4.1 Every door or shutter assembly which is used to close openings in 'A' Class bulkheads other than those referred to in paragraph 12.7.3 should be of an approved type and its construction and method of installation should be in accordance with the conditions stated on the approval certificate.

12.7.4.2 The attention of surveyors is drawn to paragraph 11.6 which deals with doors and shutters generally.

12.7.4.3 Electrical release arrangements for doors or shutters which are held in the open position are dealt with in paragraph 11.6.4.

12.7.5 Relaxation from requirements (L.S. Regulation 58(9))

12.7.5.1 Relaxations from the requirements specified respectively in paragraphs 11.5, 11.6 and 12.9 for pipes, electrical cables and ducting penetrating 'A' Class decks as indicated in L.S. Regulation 58(9) should not normally be permitted except when it is impracticable to conform with any requirement e.g. when there is insufficient space to fit a 900mm long spigot. In such cases the surveyor should submit details to Headquarters for consideration.

12.7.5.2 The reasons why relaxations cannot be specified is because there are too many variations in arrangements resulting from:

- (a) the differences in the standard of the ceiling i.e. 'B' Class or 'C' Class;
- (b) the different methods of insulating a deck i.e. by fitting the insulation on or under the deck plating or by fitting a ceiling;
- (c) the variations in the runs of the pipes, electrical cables and ducting i.e. they may or may not penetrate the ceiling;
- (d) the choice of fitting a sprinkler or detector system; and
- (e) the hazardous nature of the spaces above and below the deck.

12.7.6 External doors (L.S. Regulation 58(10))

12.7.6.1 Doors in the outer boundaries of superstructures and deckhouses may be of any material subject to compliance with loadline requirements. Where however, such doors are situated in way of lifeboat, liferaft and marine escape system embarkation, stowage, handling and lowering positions, and the decks used for transferring passengers and crew from muster stations to embarkation decks, they should be of substantial steel construction except that any such doors giving access to accommodation spaces may be of solid wood construction.

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

12.7.7 Hose ports in 'A' Class doors (L.S. Regulation 58 (11))

The requirement to fit a hose port does not apply to watertight doors, weathertight doors, doors leading to the open deck and to doors which need to be reasonably gastight. **[unified text]**

12.8 Openings in 'B' Class Divisions (L.S. Regulation 59)

12.8.1 General comment

12.8.1.1 When a 'B' Class division is intersected by structure or penetrated for any purpose, the fire integrity and insulation standard of the division should be maintained in way of such an intersection or penetration.

12.8.1.2 Pipes and cables penetrating 'B' Class divisions should be dealt with as indicated in paragraphs 11.8 and 11.9 respectively.

12.8.1.3 Ventilation ducting which penetrates 'B' Class divisions should be dealt with as indicated in paragraph 12.9.

12.8.1.4 See paragraph 11.7.9 for lighting fittings in 'B' Class ceilings and paragraph 11.7.8 for access panels in 'B' Class ceilings or linings.

12.8.2 Doors (L.S. Regulation 59(2))

12.8.2.1 Every door assembly which is used to close openings in 'B' Class bulkheads should be of an approved type and its construction and method of installation should be in accordance with the conditions stated on the approval certificate.

12.8.2.2 The attention of surveyors is drawn to paragraph 11.10 which deals with 'B' Class doors generally.

12.8.3 External doors in outer boundaries

Doors in the outer boundaries of superstructures and deckhouses may be of any material or construction, subject to compliance with any requirements imposed by the Load Line Regulations. 'B' Class door assemblies are not considered suitable for use in positions exposed to the weather.

12.8.3.1 *Hatches*

The construction of any hatch fitted in a deck of B-0 standard should be such that the integrity of the deck should not be impaired if subjected to a standard fire test of 30 minutes duration. Details of the construction and method of sealing any hatch fitted in a 'B' Class deck should be submitted to Headquarters for consideration.

12.8.4 Relaxation from requirements (L.S. Regulation 59(4))

12.8.4.1 Relaxations from the requirements specified in paragraphs 11.8, 11.9 and 12.8.1 for pipes, electrical cables and ducting penetrating decks of B-0 standard should not normally be implemented except when it can be shown that it is impracticable to conform with any requirement. In such cases the surveyor should submit details to Headquarters for consideration.

12.9 Ventilation Systems (L.S. Regulation 60)

12.9.1 Independent ventilation systems

12.9.1.1 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) stairway enclosures;
- (b) a galley or galley complex;
- (c) a machinery space of Category A, or group of machinery spaces;
- (d) a special category space;
- (e) a cargo space or group of cargo spaces; and
- (f) a Ro-Ro cargo space.

12.9.1.2 When the ventilation ducting serving a space or group of spaces which is fitted with a fixed gas fire-extinguishing system passes through any space not served by the system, the ducting should be of steel and of gas tight construction.

12.9.1.3 The ventilation system serving a space in which gas cylinders are stored should not serve any other space and should be capable of freeing the space of any gas which may leak from the cylinders. Any ducting of such a system which passes through any other space should be of steel and of gas tight construction. If such spaces are located below decks, exhaust ventilation at the rate of 6 air changes per hour should be taken from the lower part of the space.

12.9.2 Systems within main zones (L.S. Regulation 60(1))

Wherever practicable the ventilation system leading from each ventilation fan shall be within one main vertical or horizontal zone. The fan room should also be within the same main zone otherwise an excessive number of fail-safe automatic closing fire dampers may be required where ducts penetrate the main zone division.

12.9.3 Penetration of main zone divisions (L.S. Regulation 60(1))

Where of necessity a ventilation duct of any size passes through a main zone division, an approved fail-safe automatic closing fire damper is required by paragraph 7 of Schedule 3 to MSN 1667(M) to be fitted in the duct adjacent to the division and is to be capable of being manually controlled from each side of the division. The automatic damper should be fitted on the opposite side of the division to that of the spaces which the duct services. In order to comply with the

requirement for manual control on both sides of the division, the automatically operated damper should be capable of being closed manually and a manually operated damper or a suitable manual control by linkage should be fitted on the opposite side of the division to that on which the automatically operated damper is fitted (see also paragraph 11.13).

12.9.4 Smoke control (L.S. Regulation 60(2))

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 simple 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 within a 'tween deck.

12.9.5 Vertical ducts (L.S. Regulation 60(2))

12.9.5.1 For the purpose of L.S. Regulation 60(2) 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 1667(M). Compliance with this regulation 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.

12.9.5.2 Vertical ducts having a cross sectional area not exceeding 0.02m² which pass through 'A' Class decks other than those which are main zone divisions, 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.

12.9.5.3 Ducts having a cross sectional area of not less than 0.075m² and all vertical ducts of any cross sectional area are required by paragraph 1 of Schedule 3 to MSN 1667(M) to be constructed of steel or other equivalent material. Where an equivalent material such as aluminium alloy is contemplated the builder should be informed that the inside and outside of the ducts would need to be insulated to A-0 standard.

12.9.6 Air supply to control stations (L.S. Regulation 60(4))

The two entirely separate means of supplying air to control stations referred to in L.S. Regulation 60(4) may serve other spaces but in no case should they serve the same spaces. However it would be preferable for at least one of the 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.

12.9.7 Ducts from machinery spaces of Category A, galleys etc. (paragraph 2, Schedule 3 of MSN 1667(M))

12.9.7.1 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.

12.9.7.2 The fail-safe automatic closing fire damper required by paragraph 2(a)(iii) of Schedule 3 to MSN 1667(M) should be fitted on the opposite side of the boundary penetrated, to that of the space which it serves. The manual controls of the damper should be readily accessible and the operating position clearly marked.

12.9.7.3 When the measures specified in paragraph 2(b) of Schedule 3 to MSN 1667(M) are adopted and the boundary of the machinery space of Category A, galley, Ro-Ro cargo space or special category space which is being penetrated by the duct is a main zone division, in addition to the duct being insulated for its full length to A-60 standard, compliance with paragraph 7 of Schedule 3 to MSN 1667(M) is necessary. See paragraph 12.9.3.

12.9.8 Ducts from accommodation spaces etc. (paragraph 3 of Schedule 3 to MSN 1667(M))

Paragraphs 12.9.7.1, 12.9.7.2 and 12.9.7.3 apply in a similar manner to paragraph 3 of Schedule 3 to MSN 1667(M).

12.9.9 Galley exhaust ducts (paragraph 4 of Schedule 3 to MSN 1667(M))

12.9.9.1 The fail-safe automatic closing fire damper referred to in paragraph 4 of Schedule 3 to MSN 1667(M) should be positioned immediately above 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 in 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.

12.9.9.2 In all cases when an exhaust duct is fitted with branches serving different items of galley equipment, the standards stated in 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 those standards is not necessary, because a galley exhaust duct does not pass through accommodation spaces or other 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 (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.

12.9.10 Openings for recirculating or exhausting air or balancing systems

12.9.10.1 L.S. Regulation 59(2) permits openings in the lower part of 'B' Class doors through which air from cabins and similar 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.

12.9.10.2 Air from spaces surrounded by 'A' Class divisions should not be exhausted directly into corridors for recirculation 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 provided 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.

12.9.10.3 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 in addition, comply with the constructional requirements and also the requirements for the provision of fire and smoke dampers of L.S. Regulation 60 and Schedule 3 to MSN 1667(M). They should normally be fitted with sliding or hinged steel shutters at their ends.

12.9.11 Ducts passing through 'A' Class divisions (L.S. Regulation 60(2))

12.9.11.1 Where a thin plated ventilation duct with a free sectional area equal to, or less than 0.02m² in cross sectional area passes through 'A' class bulkheads or decks, other than those which are main zone divisions, the opening should be lined with a steel sheet sleeve having a thickness of at least 3mm and a length of at least 200mm, divided preferably into 100mm on each side of the bulkhead, or in the case of the deck, totally laid on the lower side of the decks pierced. **[unified text]**

Any gap between the duct and the sleeve should be effectively packed with an approved 'A' Class mineral wool and the ends sealed with a suitable flexible sealant.

12.9.11.2 Ventilation ducts with a free sectional area in excess of 0.02m² passing through 'A' Class bulkheads or decks other than those which are main zone divisions should be treated as indicated in the following table:

Cross sectional Area of duct	Type of duct	Treatment
Exceeding 0.02m ² but not exceeding 0.075m ²	Steel ducts. Aluminium alloy ducts. Double and single skinned spiroducts.	Approved fire damper units are to be fitted consisting of a steel coaming having a minimum length of 900mm and a thickness as indicated below, the coaming being welded or bolted to the division and incorporating a manually operated fire damper operable from each side of the division. The ducts are to be effectively attached to the steel coaming.
Exceeding 0.075m ²	Steel ducts. Aluminium alloy ducts. Double and single skinned spiroducts.	Approved fire damper units are to be fitted consisting of a steel coaming having a minimum length of 900mm and a thickness as indicated below, the coaming being welded or bolted to the division and incorporating a fail-safe automatic closing/manually operated fire damper operable from each side of the division. The ducts are to be effectively attached to the steel coaming.

Table 12.1

12.9.11.3 (Paragraph 12.9.7.1 and 12.9.8 indicates the situations in which spiroducts are not permitted) The thickness of the steel coamings incorporating fire dampers for closing openings in ventilation ducts should be determined as indicated in the following table:

Width or diameter of duct	Minimum thickness of coaming or sleeve
Up to and including 300mm	3mm
760mm and over	5mm

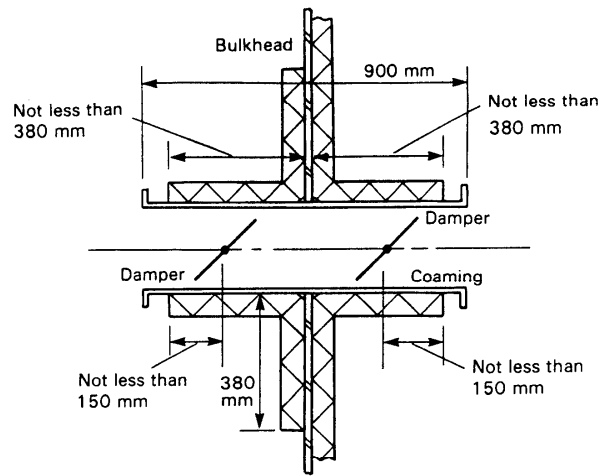
Table 12.2

12.9.11.4 For widths or diameters of ducts exceeding 300mm but not exceeding 760mm the thickness of coaming or sleeve to be obtained by interpolation.

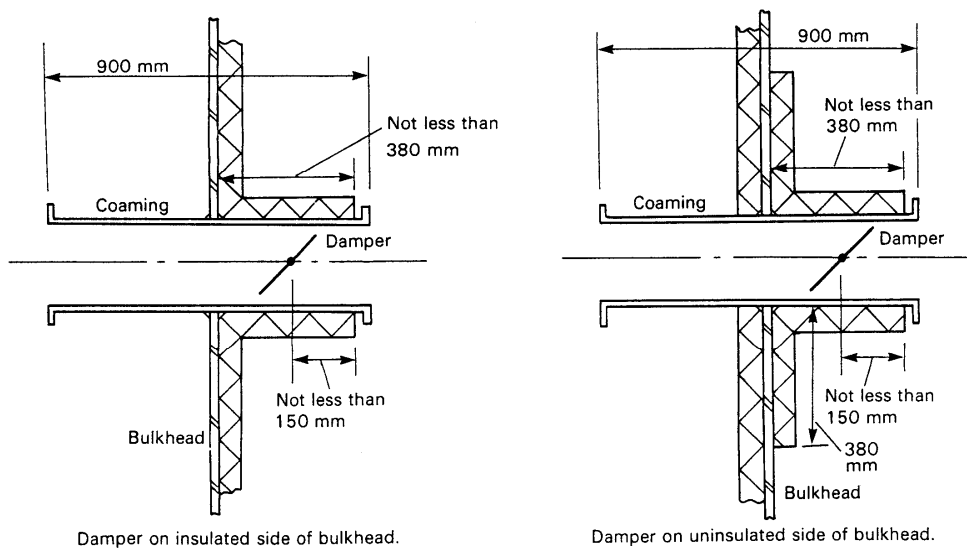
12.9.11.5 When any duct not exceeding 0.02m² in cross sectional area passes through an insulated 'A' Class division the duct or steel sleeve should be insulated for a distance of not less than 380mm from the division with 'A' Class mineral wool insulation having a thickness equivalent to that fitted over the plating of the division.

12.9.11.6 When any duct exceeding 0.02m² in cross sectional area passes through an insulated 'A' Class division the steel coaming incorporating the fire dampers should be insulated with an 'A' Class mineral wool insulation having a thickness equivalent to that fitted over the plating of the division as

indicated in figures 12.3 and 12.4. The insulation is to be attached by means of welded steel pins, wire netting and spring steel washers.

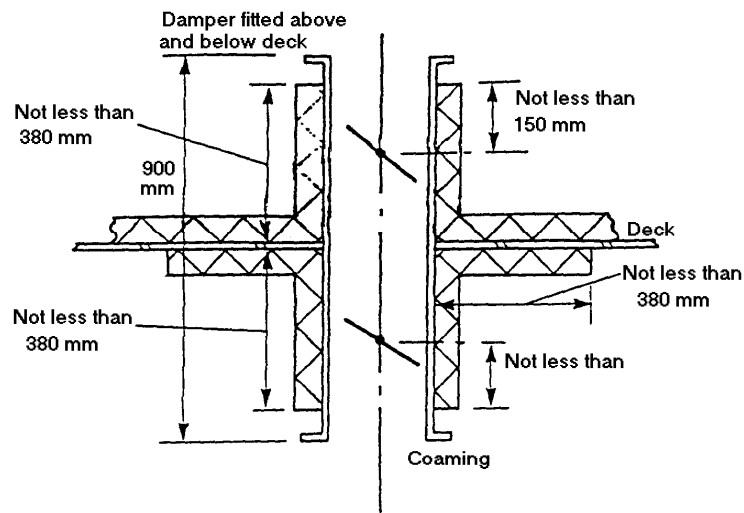


(a) Insulation fitted on coaming incorporating double dampers.

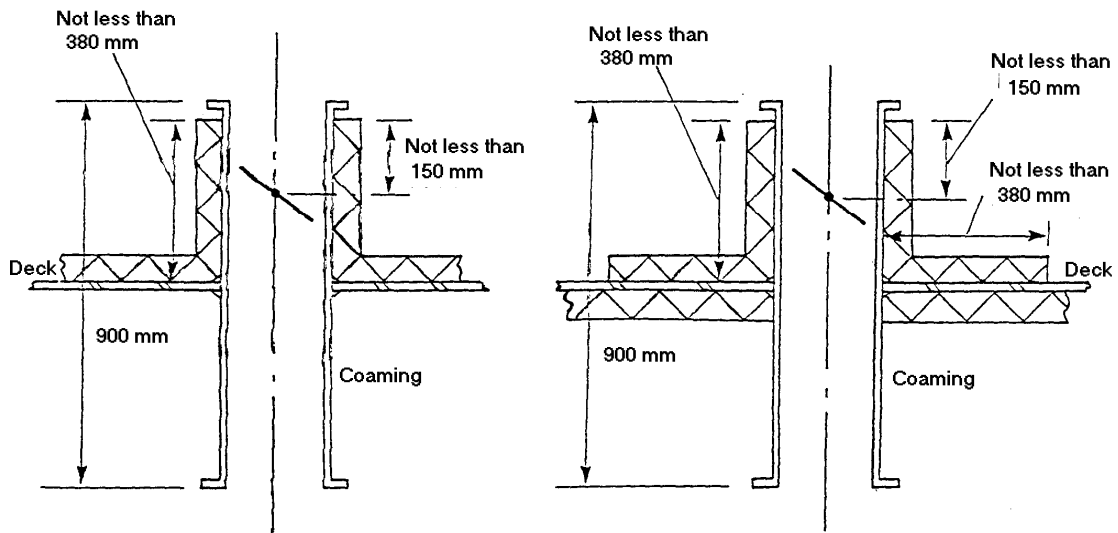


(b) Insulation fitted on coaming incorporating single dampers.

Fig 12.3



(a) Insulation fitted on coaming incorporating double dampers



(i) Deck insulated on upper side

(ii) Deck insulated on under side

(b) Insulation fitted on coaming incorporating single dampers

Fig 12.4

12.9.11.7 Where of necessity ventilation ducts of any cross sectional area pass through main zone bulkheads or decks they should be treated in the same manner as specified in table 12.1 for ventilation ducts having a cross sectional area exceeding 0.075m^2 .

12.9.12 Fire resisting ducts (paragraph 5(b) of Schedule 3 to MSN 1667(M))

12.9.12.1 Fire dampers are not required to be fitted in a duct which passes through a space surrounded by 'A' Class divisions and has no openings into the space, subject to paragraph 12.9.12.2 and provided that the duct:

- (a) has the same thickness as a steel coaming of the same size as indicated in paragraph 12.9.11;
- (b) is adequately supported and stiffened; and
- (c) is insulated to the same 'A' Class standard as the divisions through which it passes or to the higher standard when the divisions have differing 'A' Class standards. This is illustrated by figure 12.5 below.

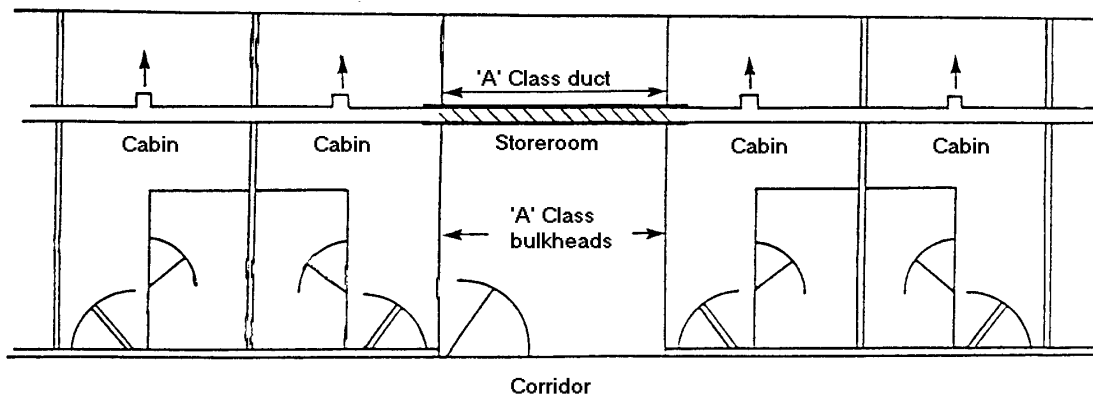


Fig 12.5

The dispensing of fire dampers in this manner shall not apply when a duct passes through a main zone division, because paragraph 7 of Schedule 3 to MSN 1667(M) still applies.

12.9.12.2 Notwithstanding paragraph 12.9.12.1, when a duct serves spaces bounded by 'A' Class divisions and which are situated on each side of another space into which the duct has no openings, fire dampers are still required to be fitted at each end of the 'A' Class ducting in order to maintain the integrity of the two outer spaces from each other. This is illustrated by figure 12.6.

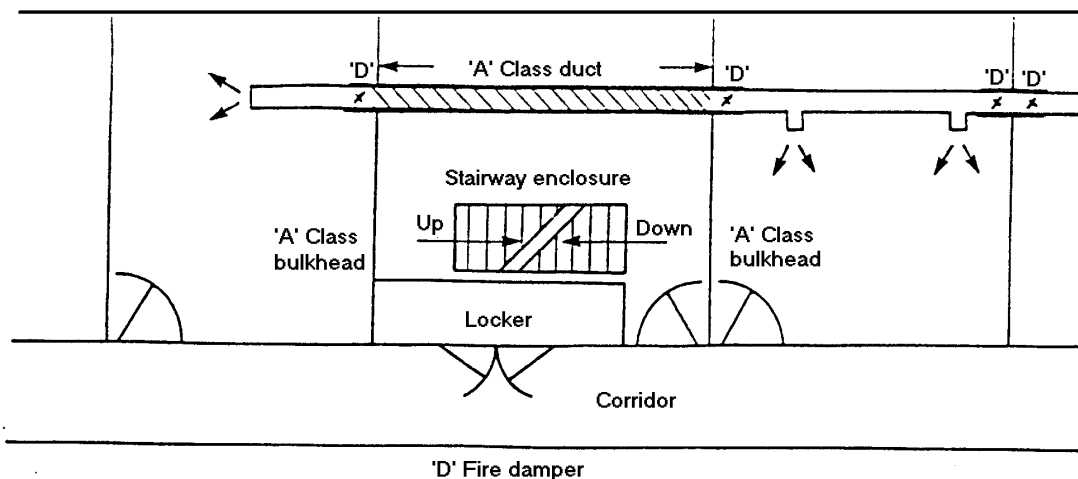


Fig 12.6

12.9.13 Ducts passing through 'B' Class divisions (paragraph 6 of Schedule 3 to MSN 1667(M))

Ventilation ducts passing through 'B' Class bulkheads, ceilings or linings should be treated as indicated in the following table;

Cross sectional Area of duct	Type of duct	Treatment
Not exceeding 0.02m ²	Steel ducts other than spiroducts. Double skinned spiroducts.	To be collared to the division. The collars may be of steel or of the same material and thickness as the division.
	Single skinned spiroducts. Aluminium alloy ducts.	To be passed through a steel sleeve having a length and thickness of not less than 600mm and 1.0mm respectively collared to the division. The collars may be of steel or of the same material and thickness as the division. The gap between the sleeve and the duct should be effectively packed with a non-combustible material and the ends sealed with a suitable flexible sealant.
Exceeding 0.02m ² but not exceeding 0.075m ²	Steel ducts other than spiroducts. Double skinned spiroducts.	To be collared to the division with steel collars.
	Single skinned spiroducts. Aluminium alloy ducts.	To be passed through a steel sleeve having a length and thickness of not less than 900mm and 1.0mm respectively collared to the division. The collars are to be of steel. The gap between the sleeve and the duct should be effectively packed with a non-combustible material and the ends sealed with a suitable flexible sealant.
Exceeding 0.075m ²	Steel ducts other than spiroducts.	To be collared to the division with steel collars.
	Double and single skinned spiroducts. Aluminium alloy ducts.	To be passed through a sleeve having a length and thickness of 900mm and 1.5mm respectively collared to the division. The collars are to be of steel. The gap between the sleeve and the duct should be effectively packed with a non-combustible material and the ends sealed with a suitable flexible sealant.

Table 12.2

When any duct passes through a 'B' Class division of B-15 standard the ducts, sleeves or spigots should be insulated on one side of the division for a distance of at least 380mm from the division with an 'A' Class mineral wool insulation of A-15 standard attached by means of wire netting and wire to the satisfaction of the surveyor.

12.9.14 Fire dampers

Every fire damper which is used to close openings in ventilation ducts penetrating 'A' Class divisions should be of an approved type and its construction and method of installation should be in accordance with the conditions specified in the approval certificate (see also paragraph 11.13).

12.9.15 Arrangement of exhaust fans for smoke extracting systems

The application of L.S. Regulation 60(6) does not imply the need for additional exhaust fans other than those normally dedicated to the space considered, provided these latter fans are of sufficient size to meet the required capacity, [unified text].

12.10 Windows and Sidescuttles (L.S. Regulation 61)

12.10.1 Interior windows and sidescuttles (L.S. Regulation 61(1))

12.10.1.1 Every window or sidescuttle within accommodation spaces, service spaces and control stations other than those fitted in the boundaries of the hull, superstructures and deckhouses referred to in L.S. Regulations 58(10) and 59(3) is required to be constructed such that the integrity standards of the bulkheads in which it is fitted are not impaired. Since insulating glasses are readily available such glasses should have an insulating value equivalent to the divisions in which they are to be fitted. In addition glasses and the interior window frames in which they are fitted should satisfy the thermal radiation test stated in the International Code for Application of Fire Test Procedures - MSC 61(67) Annex 1, Part 3, Appendix 1 refers. Each window or sidescuttle which is fitted in such internal 'A' Class or 'B' Class bulkheads should be of an approved type and should be constructed and fitted in accordance with the conditions stated in the approval certificate. Note also that L.S. Regulation 67(b) prohibits the fitting of windows in the boundaries of machinery spaces.

12.10.1.2 Every window or sidescuttle fitted within the accommodation spaces, should be constructed, with glass which breaks safely.

12.10.2 Windows facing lifeboat and liferaft positions (L.S. Regulation 61(2)(b) and (3))

12.10.2.1 Windows facing lifeboat, liferaft or marine escape system embarkation, stowage, handling and lowering positions and windows within 3 m of such positions and windows facing or within 3 m of any deck which is used for transferring passengers or crew from a muster station to an embarkation deck should be fitted with an approved fire resisting glass. The glass should be fitted in accordance with the conditions in the approval certificate.

12.10.2.2 The performance required by L.S. Regulation 61(2)(b) is a fire integrity of at least 30 minutes when tested in a standard fire test. In the context of L.S. Regulation 61(3) 'integrity' should be taken to include the insulation value.

12.11 Restriction of Combustible Materials (L.S. Regulation 62)

12.11.1 Laminates, paints etc. - surface spread of flame (L.S. Regulation 62(1))

12.11.1.1 The laminates, veneers, paints and other finishes on the surfaces specified in L.S. Regulation 61(1) other than surface floor coverings in corridors and stairway enclosures are required to have a Class 1 surface spread of flame rating when tested in accordance with British Standard 476: Part 7: 1997 and are to have been approved before use. (Note: a Class I standard by BS476: Part 7: 1997 may be accepted as equivalent to a 'pass' by IMO Resolution A 653(16)). In each case the finish material should be applied using the adhesive and substance referred to in the approval certificate.

12.11.1.2 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 which it was tested without the prior consent of Headquarters.

12.11.1.3 Approved non-combustible materials which are used without any surface finishes may be accepted as having a Class 1 surface spread of flame rating without having been subjected to a surface spread of flame test.

12.11.1.4 Surface floor coverings in corridors and stairway enclosures need not be tested to the above mentioned British Standard provided that they have been approved as deck coverings.

12.11.1.5 Surface floor coverings should not be laid under 'A' Class insulations (see paragraphs 11.3.4.3 and 11.3.6.2), 'B' Class bulkheads or linings (see paragraph 11.7.5) and 'C' Class divisions (see paragraph 11.11.3).

12.11.2 Total volume of combustibles (L.S. Regulation 62(2)(a))

12.11.2.1 The total volume of combustibles from which the thickness of equivalent veneer is obtained should include laminates, wallcoverings, veneers, paints or any other finishes; skirtings; architraves and covings; mouldings and frames round mirrors, pictures and light fittings; window boxes and any other combustibles used for decorative or other purposes on the bulkheads, ceilings and linings of a space. Any wood dance floors should also be included (paragraph 12.1.2 refers).

12.11.2.2 The total volume of combustibles should not include any textile materials, floor coverings or any part of built-in or free-standing furniture including any wood or chipboard backing board separating adjacent built-in seats provided that the board does not extend more than 300mm above the upholstery on the seat backs. In no case should a 'B' Class or 'C' Class bulkhead, ceiling or linings, or a lining or ceiling used respectively as the insulating medium for an 'A' Class bulkhead or deck be dispensed with in way of built-in furniture or any feature referred to in paragraph 12.11.2.1.

12.11.2.3 In the case of a ship protected by a sprinkler system where it is not possible to incorporate a decorative feature in a 'C' Class division using non-combustible materials e.g. a radiused corner or shaped portion, the decorative feature may be constructed of wood or composite wood products provided that it is of minimum dimensions compatible with the design and is included in the total volume of combustible referred to in paragraph 12.11.2.1.

12.11.2.4 Each partial bulkhead or partition of any height or partial deck used to divide a space for utility or artistic purposes excluding any backing board referred to in paragraph 12.11.2.2, should be constructed as 'C' Class divisions and any of the features referred to in paragraph 12.11.2.1 which are on the divisions should be included in the total volume of combustibles. In the case of a sprinkler protected ship any such divider, partial bulkhead or partition of full height may be included in the combined area of bulkheads, ceilings and linings for the purpose of obtaining the thickness of veneer equivalent to the total volume of combustibles.

12.11.3 Surface finishes - gross calorific potential (L.S. Regulation 62(2)(b))

For the purpose of this regulation veneers shall include laminates, wallcoverings or any other surface finishes. Surface finishes approved by the MCA will satisfy this requirement. For the purpose of such approvals, finishes which exceed 1.5mm in thickness are required to be tested to show that their gross calorific potential is less than 45 MJ/m². Finishes less than 1.5mm in thickness may be assumed to satisfy the requirement.

12.11.4 Furniture in corridors and stairway enclosures (L.S. Regulation 62(2)(c))

12.11.4.1 The requirements of L.S. Regulation 62(2)(c) will be satisfied if compliance with L.S. Regulation 57(6) is achieved, see also paragraph 12.6.7.

12.11.4.2 Note that drinking water dispensers and ice cube machines may be permitted in corridors, provided they are fixed and do not restrict the width of the escape routes. This also applies to decorative flower or plant arrangements, statues or other objects or art such as paintings and tapestries in corridors and staircasings.

12.11.5 Primary deck coverings (L.S. Regulation 62(2)(d))

12.11.5.1 A primary deck covering is to be regarded as the first layer of a floor construction which is applied directly on top of the deck plating and is inclusive of any priming coat, anti-corrosive compound or adhesive which is necessary to provide protection or adhesion to the deck plating. This is the definition of a primary deck covering accepted by the IMO.

12.11.5.2 Every primary deck covering used in accommodation spaces, service spaces and control stations is to be of an approved type and should be laid in accordance with the conditions in the approval certificate.

12.11.5.3 Combustible primary deck coverings should not be laid under 'A' Class insulations (see paragraphs 11.3.4.3 and 11.3.6.2), 'B' Class bulkheads or linings (see paragraph 11.7.5) and 'C' Class bulkheads or linings (see paragraph 11.11.3).

12.11.5.4 For primary deck coverings which incorporate 'A' Class overdeck insulation see paragraph 11.3.6.

12.11.6 Non-combustible materials (L.S. Regulation 62(3)(a))

12.11.6.1 General

Any material which is required by L.S. Regulation 62(3)(a) to be non-combustible should be of an approved type except where such materials are not required to be tested as indicated in paragraph 11.2.7.

12.11.6.2 Ceilings and linings

Ceilings and linings within accommodation spaces, service spaces, control stations and machinery spaces except in mail rooms, baggage rooms and refrigerated compartments, are required by L.S. Regulation 62(3)(a) to be constructed of non-combustible materials and may be the insulating media for 'A' Class divisions and/or 'B' Class divisions or 'C' Class divisions depending on the arrangements of the ship. See paragraph 11.3 for ceilings and linings which are the insulating media for 'A' Class divisions, paragraph 11.7 for ceilings and linings which are 'B' Class divisions and paragraph 11.11 for ceiling and linings which are 'C' Class divisions.

12.11.6.3 Draught stops

Draught stops are required by L.S. Regulation 62(3)(a) to be constructed of non-combustible materials. Any of the following methods of construction may be used to form draught stops:

- (a) the extension of 'B' Class bulkheads, ceilings or linings the details of which are shown on the appropriate approved drawings;
- (b) the extension of 'C' Class bulkheads, ceilings or linings;
- (c) steel curtain plates, stringers or webs intermittently welded to the structure, stiffened where necessary and attached to the top profiles of bulkheads or fitted tightly to ceilings or linings. Any lightening holes in ships structure which is used as part of a draught stop should be plated over;
- (d) approved non-combustible board type materials supported by steel flat bars or steel angle or channel profiles attached to the ships structure, bulkheads, ceilings or linings and fitted tightly to such structure or divisions;
- (e) approved 'A' Class mineral wool insulation faced on each side with expanded steel or weldmesh (50 mm maximum mesh size), the sheets of expanded steel or weldmesh being tied together through the insulation by galvanised wire at not more than 450mm spacing. The expanded steel or weldmesh on one side of the insulation should be attached to the ships structure, bulkheads, ceilings or linings. Wire netting may be substituted for expanded steel or weldmesh on one side, but not on both sides of the draught stop; in such cases the securing ties should be spaced not more than 300mm apart. Adjacent slabs of insulation should be fitted tightly together and slabs adjacent to the structure, bulkheads, ceilings or linings should be fitted tightly to such structure or divisions. The insulation should not be less than 35mm in thickness.

The construction of the draught stops should be to the satisfaction of the surveyor. However in no case should draught stops be wedged in place without any attachment to structure, bulkheads, ceilings or linings. The draught stops should form a close fit round pipes, cables, ducts or any other penetrations. See also paragraph 12.12.5.

12.11.6.4 Insulating materials

(a) Insulating materials which are used in accommodation spaces, service spaces, control stations and machinery spaces for fire, thermal (comfort), acoustic or any other purpose, are required by L.S. Regulation 62(3)(a) to be non-combustible except that this requirement does not apply to:

- (i) mail and baggage rooms;
- (ii) refrigerated compartments; and
- (iii) 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.

(b) The 'exception' referred to in sub-paragraph (a)(iii) above, may include the 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.

(c) Where organic foam, 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 1998 (Regulation 31 refers). Notwithstanding the 'A' Class integrity and insulation standards required by the tables in Schedule 1 to MSN 1667(M), the bulkheads and decks separating accommodation spaces, service spaces, control stations and machinery spaces from such refrigerated compartments should be insulated on the outside of the refrigerated compartments to A-60 standard. The insulation in the refrigerated compartments should be faced with galvanised steel or aluminium alloy sheets having a thickness of 1.0mm or 1.5mm respectively. See also paragraphs 11.17 and 12.5.12.

12.11.7 Oil and oil vapour barriers (L.S. Regulation 62(3)(a)(iv))

L.S. Regulation 62(3)(a)(iv) permits oil and oil vapour barriers to be combustible but requires their exposed surfaces to have Class 1 surface spread of flame rating when tested in accordance with British Standard 476: Part 7: 1971, (Class 1 by BS 476: Part 7: 1987 may be accepted as equivalent to the foregoing standard, as

may a 'pass' in accordance with IMO Resolution A 653(16)) Such materials are required to have type approval before use. See also paragraph 12.12.4.

12.11.8 Adhesives (L.S. Regulation 62(3)(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 12.11.1 and 12.11.5 to substrates is required to be the same as that used to bond the samples of the finish materials subjected to the surface spread of flame tests.

12.11.9 Smoke and toxicity (L.S. Regulation 62(3)(b))

12.11.9.1 This requirement relates to the production of smoke and toxicity. It applies to the finishes of bulkheads, linings, ceilings and the surface deck coverings in corridors, stairway enclosures and furnishings of restricted fire risk.

12.11.9.2 Prior to the introduction of the International Code for Application of Fire Test Procedures (IMO Resolution MSC 61(67) refers), it was not necessary to verify this property by testing. Now however new products are to be tested and approved for use by the procedures stated in the International Code. Such tests to be 'phased in' according to the dates given in the IMO Resolution.

12.12 Miscellaneous Items (L.S. Regulation 63)

12.12.1 Pipes penetrating 'A' and 'B' Class divisions (L.S. Regulation 63(1)(a))

For the treatment of pipes which penetrate 'A' Class and 'B' Class divisions see paragraphs 11.4 and 11.8 respectively.

12.12.2 Materials used for oil pipes (L.S. Regulation 63(1)(b))

Materials, used for pipes intended for the transfer of oil and other flammable liquids should be as specified in paragraph 4(j) of Schedule 4 to MSN 1671(M) i.e.; they shall be of steel or other suitable material, except that flexible pipes may be permitted where the Certifying Authority is satisfied that they are necessary; such flexible pipes and their attachments shall be constructed to the satisfaction of the Certifying Authority.

12.12.3 Overboard scuppers, discharges etc. (L.S. Regulation 63(1)(c))

Where the ship's side valves and fittings and piping between valves are of a material other than steel or bronze the physical properties of the material including its melting point should be submitted to Headquarters for consideration.

12.12.4 Oil and oil vapour barriers (L.S. Regulation 63(1)(d))

12.12.4.1 *Flexible vapour barriers*

(a) Any joint in a flexible oil and oil vapour barrier should be sealed with tape of the same material as the vapour barrier or a compatible material having a minimum width of 50mm using an adhesive which is also compatible. The advice of the manufacture of the insulation or vapour barrier should be sought where there is doubt as to the compatibility of materials.

(b) It should be noted that in no case where a vapour barrier is fitted should the wire netting securing an 'A' Class insulation be dispensed with.

(c) Where there is a risk of an 'A' Class insulation becoming damaged by the shipping or unshipping of items of machinery or similar operations, then the surveyor should advise the shipbuilder to fit a metal oil and oil vapour barrier referred to in the following paragraph in order to afford some protection to the insulation. See also paragraph 12.11.7.

12.12.4.2 *Metal vapour barriers*

(a) In no case must a metal vapour barrier be fitted directly on the face of an 'A' Class insulation in lieu of the wire netting or otherwise because investigation of fire casualties has revealed that the restraint afforded by the steel pins against expansion has buckled the metal vapour barrier causing serious damage to the insulation and forcing the spring washers off the pins resulting in the falling down of the barrier and insulation.

(b) Metal oil and oil vapour barriers should be attached to the ship's structure independently of an 'A' Class insulation with a gap of at least 20mm between the exposed face of the insulation and the vapour barrier. The number and size of the means of securing the vapour barrier to the structure should be kept to a minimum in order to ensure that heat transfer through the insulation is minimal. In no case should a penetration exceed 100mm² in cross sectional area, nor should it be spaced less than 500mm from another penetration. Wherever possible the means of securing the vapour barrier should be attached to bulkhead stiffeners or deck beams. Figures 12.7 and 12.8 show two typical methods of attaching a metal vapour barrier to the structure, however any other method of attachment will be considered by the MCA. See also paragraph 12.11.7.

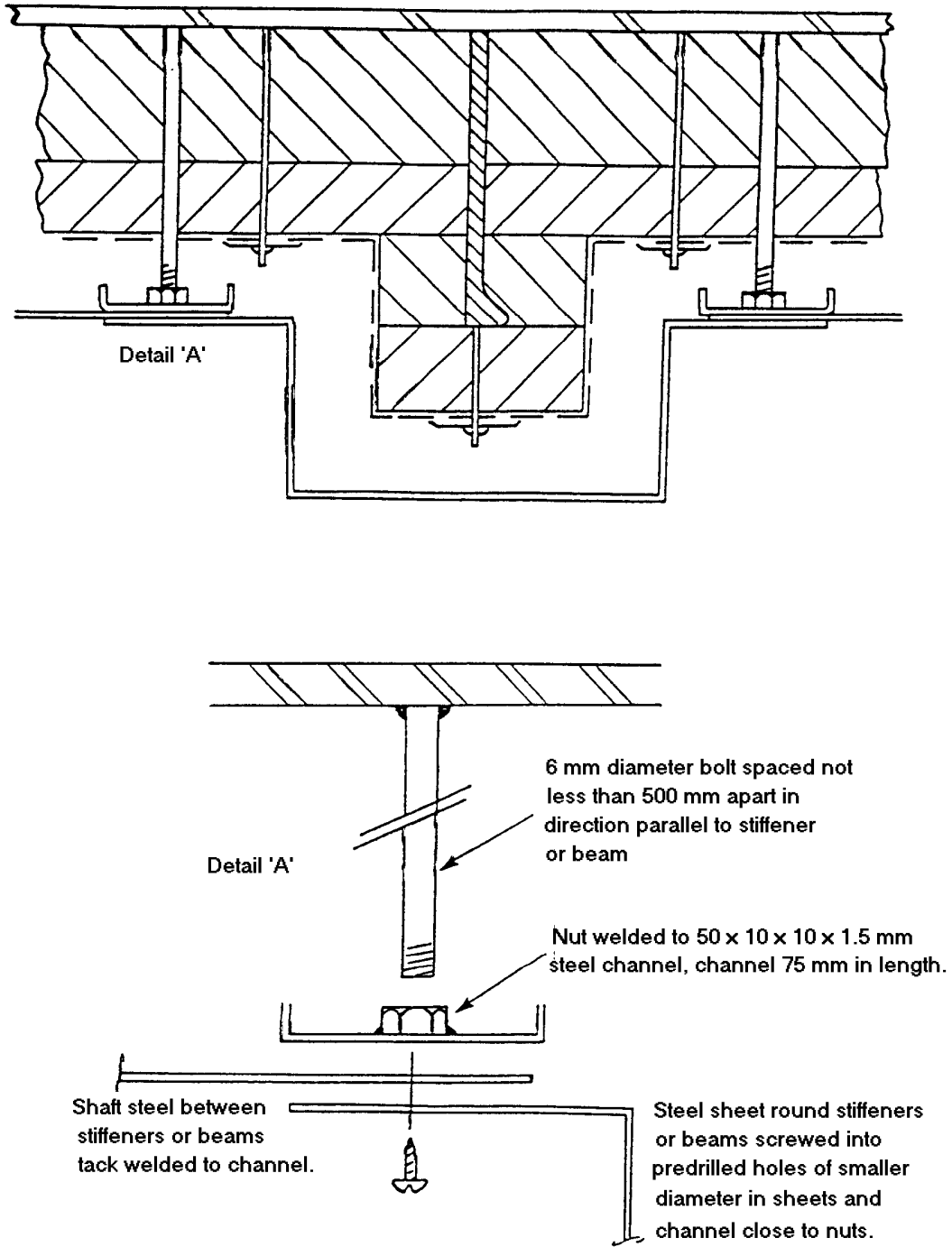


Fig 12.7 Typical metal vapour barrier

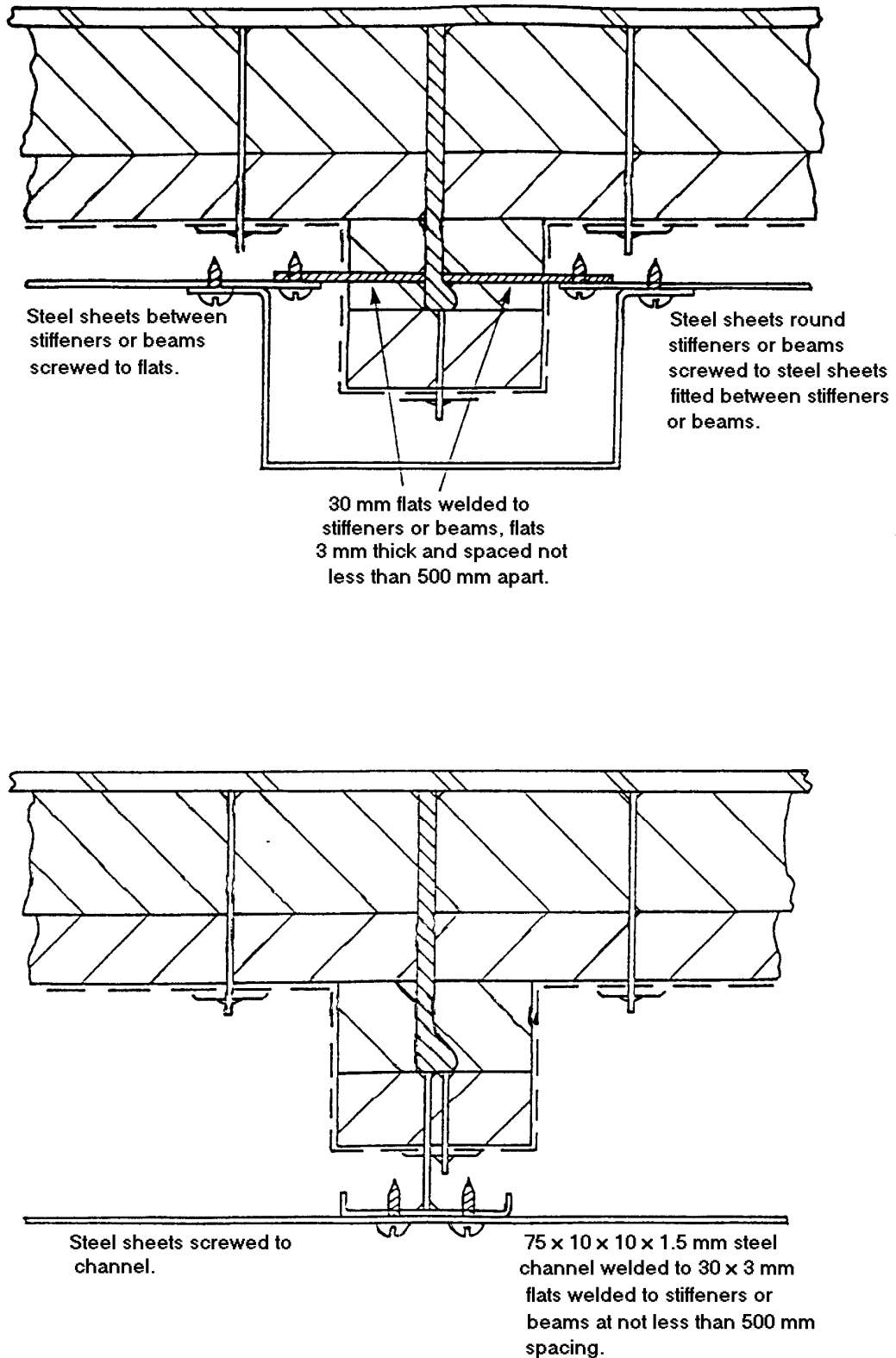


Fig 12.8 Typical metal vapour barriers

(c) When perforated sheet metal is fitted over an 'A' Class insulation for acoustic purposes it is to be fitted in a similar manner to a metal oil and

oil vapour barrier as specified above and similarly must not be fitted directly on the insulation. However a perforated sheet metal cannot be regarded as an oil and oil vapour barrier, and a vapour barrier of the type referred to in paragraph 12.12.4.1 should be fitted either on the face of the insulation or on the concealed side of the perforated sheet metal.

12.12.5 Draught stops (L.S. Regulation 62(3)(a))

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

12.12.5.2 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 develop quite rapidly in such a space and would be nearly as difficult to control as a fire behind an unperforated ceiling.

12.12.5.3 Draught stops should be constructed as indicated in paragraph 12.11.6.3.

12.12.6 Closure of decks (L.S. Regulation 63(2)(a))

12.12.6.1 L.S. Regulation 63(2)(a) requires air spaces behind ceilings and linings to be closed at each deck. The integrity and insulation standards of decks as specified in tables 3 and 4 in Schedule 1 to MSN 1667(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. The air spaces behind ceilings and linings cannot be regarded as void spaces (Category 10 spaces) because the ceilings and linings separating the air spaces from the accommodation spaces, service spaces and control stations would have to be 'A' Class divisions in compliance with tables 1 to 4 inclusive, in Schedule 1.

12.12.6.2 The integrity and insulation standards of decks behind ship's side linings should not be impaired by any means which may be adopted to enable a ship to withstand the effects of damage.

12.12.6.3 Where openings are cut in a deck behind linings in order to permit rapid down-flooding when the ship sustains damage above that deck, the openings should be enclosed in 'A' Class bulkheads and steps therein, of the appropriate standard as indicated in the tables in Schedule 1 to MSN 1667(M). They should extend from the deck in which the openings are situated to above the deepest waterline. See figure 12.9.

12.12.6.4 Any pipes which are provided for the rapid release of air from a space below the bulkhead deck into another space situated above it in order to facilitate cross-flooding in a damaged condition, should be fitted with steel flaps as shown in figure 12.10 so as to maintain the 'A' Class integrity of the

deck separating the two spaces. Any proposed alternative arrangement should be submitted to Headquarters for consideration.

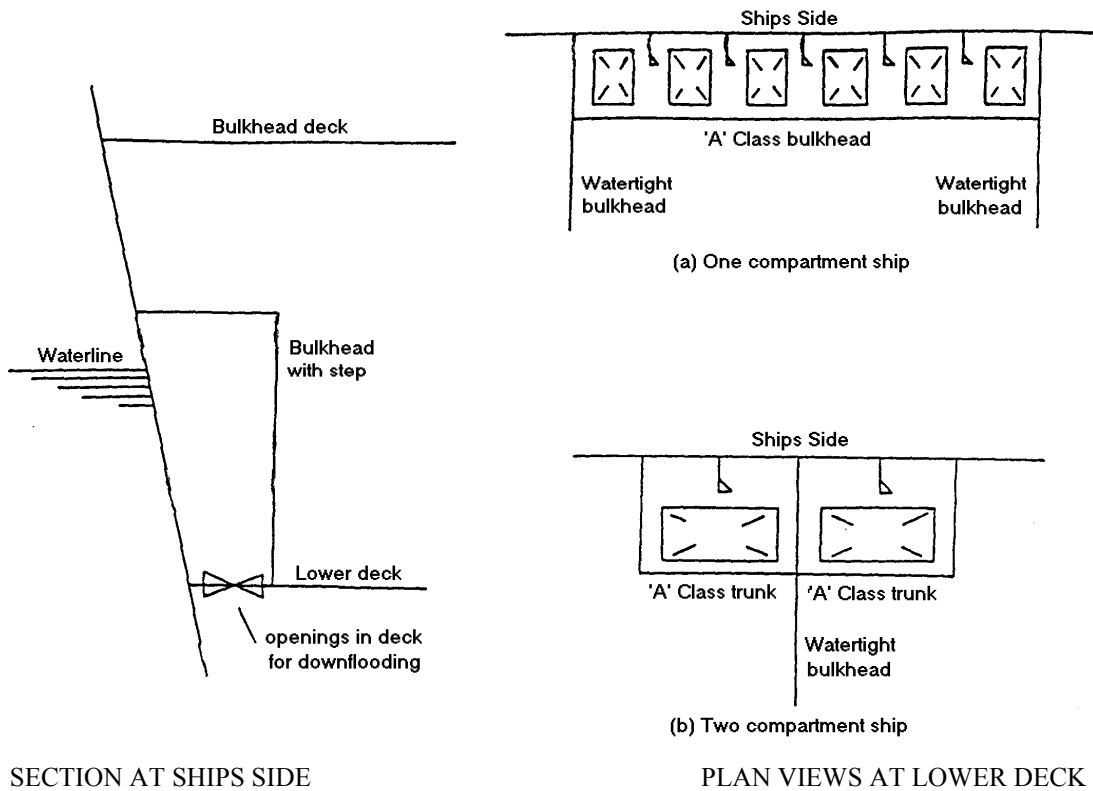


Fig 12.9 Two typical arrangements of downflooding ducts illustrating paragraph 12.12.6.3

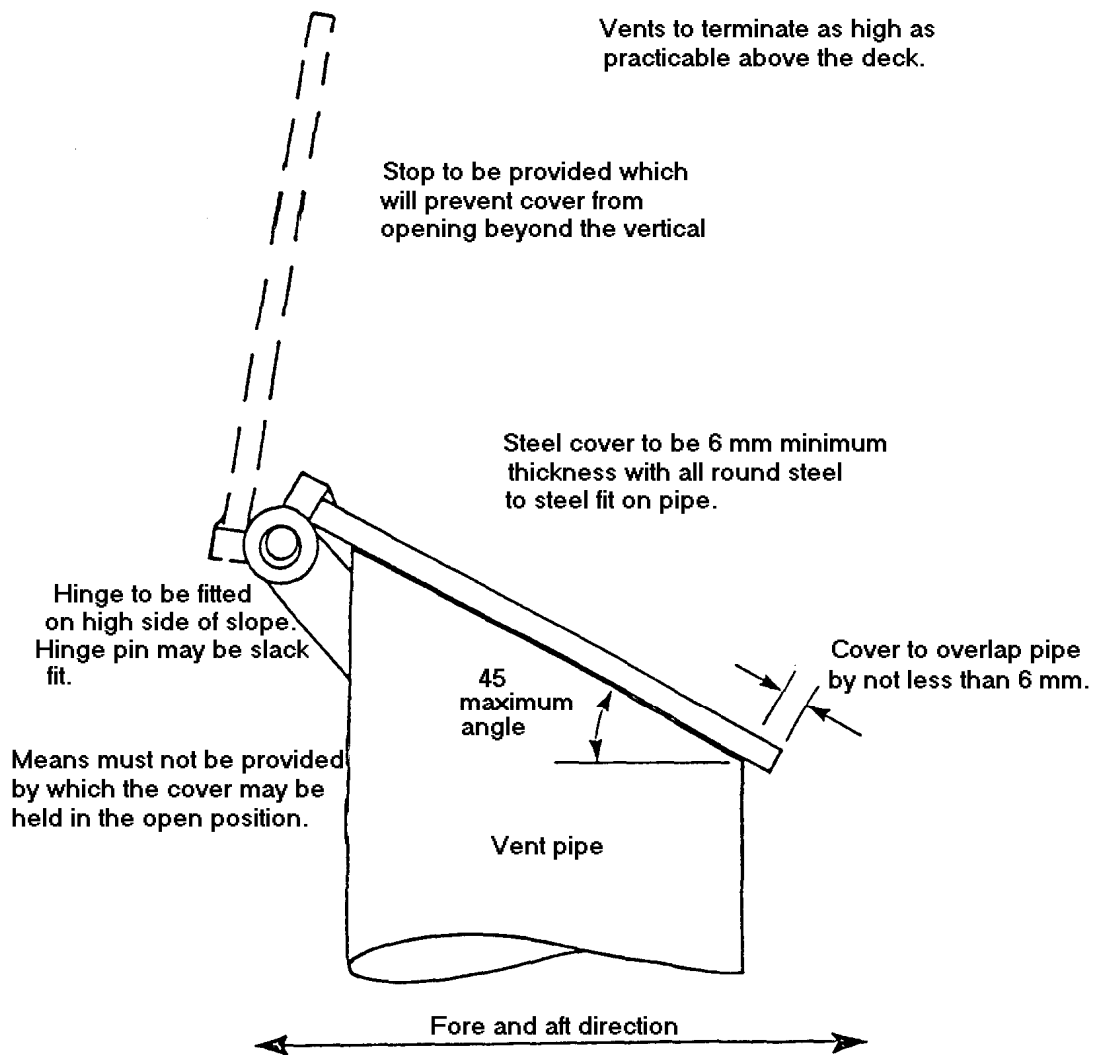


Fig 12.10 Air vents for cross-flooding of void spaces

12.12.7 Detection of smoke (L.S. Regulation 63(2)(b))

12.12.7.1 A hole approximately 20mm in diameter in the ceiling or lining of each enclosed space may be accepted as complying with this requirement. Such holes should be fitted with a suitable fire resistant cover to be kept normally closed.

12.12.7.2 In the case of ceilings, suitably positioned removable panels or trays giving viewing access to the void can be accepted as an alternative.

12.12.7.3 Note, this regulation does not apply to enclosed spaces which do not contain electrical wiring or combustible fittings.

12.12.8 Electric space heaters (L.S. Regulation 63(2)(c))

In this requirement 'similar materials' includes free-standing furniture, particularly those items with upholstered parts, which should not be placed near to the heater.

12.13 Sprinkler and Detector Systems (L.S. Regulation 64)

12.13.1 Surveyors should ensure that automatic sprinkler and fixed fire detection system configurations as well as spacings of sprinkler or detector heads comply with Schedules 1 and 5 respectively, to MSN 1666(M).

12.13.2 Spaces containing only private or public washing or toilet facilities may be regarded as affording no substantial fire risk.

12.13.3 Control stations containing essential electrical equipment may be fitted with dry sprinklers provided the associated valves are in a readily accessible position outside such protected spaces. The operating positions should be clearly marked.

12.13.4 CO₂ rooms need not be protected by a smoke detection system. [unified text]

12.14 Special Category Spaces and Ro-Ro Cargo Spaces (L.S. Regulation 65)

12.14.1 Ventilation fans serving special category spaces or Ro-Ro cargo spaces and machinery used for operating bow or stern doors should be situated in spaces separated from the special category spaces or Ro-Ro cargo spaces by 'A' Class divisions as specified in tables 1, 3 or 5 of Schedule 1 to MSN 1667(M). Fans with motors of less than 2kW used for stirring the air within a special category space in order to prevent stratification may be situated within the space subject to; the fan motors complying with the Merchant Shipping (Passenger Ship Construction; Ships of Classes I, II and II(A)) Regulations 1998, Regulation 60(3); and the fan blades being of a non-sparking type.

12.14.2 Air pipes to tanks or voids should not terminate within a special category space or a closed Ro-Ro cargo space because they impair the 'A' Class integrity of the deck which separates such spaces. The air pipes should be taken to open decks or looped over within the special category space and taken out through the ships side. See also paragraph 12.12.6.

12.15 Special Arrangements for Machinery Spaces (L.S. Regulation 67)

12.15.1 For the purpose of, L.S. Regulation 67(b), sidescuttles should be regarded as windows.

12.15.2 L.S. Regulation 67(c) requires doors in the boundaries of a machinery space of Category A, other than watertight doors and the firescreen door referred to in L.S. Regulation 67(d), to be approved 'A' Class doors which are:

12.15.2.1 of a self-closing type capable of closing against an adverse inclination of up to $31\frac{1}{2}^{\circ}$; or

12.15.2.2 fitted with power operated closing arrangements operable from outside the machinery space at a control position having safe access from the open deck.

12.15.3 The lightweight fire-screen door referred to in L.S. Regulation 67(d) should be constructed of steel having a minimum thickness of 3mm and 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 stiffened as necessary to the satisfaction of the surveyor. The door should 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.