
STATUTORY INSTRUMENTS

1998 No. 2514

**The Merchant Shipping (Passenger Ship Construction:
Ships of Classes I, II and II(A)) Regulations 1998**

PART II

STRENGTH, CONSTRUCTION AND WATERTIGHT SUBDIVISION

Application

6. This Part applies to all ships, except that a ship which complies fully with regulations 2 to 8, 11 and 13 of IMO Resolution A.265(VIII) need not comply with all the requirements of this Part, but only with regulations 10, 14, 17 to 19 (inclusive) and 21, Sections 2, 3 and 4 of Schedule 4 and Schedules 10 in Merchant Shipping Notice MSN 1698 (M).

Structural strength

7. The structural strength of every ship shall be sufficient for the service for which the ship is intended.

Watertight subdivision

8. Every ship shall be subdivided by bulkheads, which shall be watertight up to the bulkhead deck, into compartments the maximum length of which shall be calculated in accordance with such of the provisions of Schedule 2 in Merchant Shipping Notice MSN 1698 (M) as apply to that ship. Every other portion of the internal structure which affects the efficiency of the subdivision of the ship shall be watertight, and shall be of a design which will maintain the integrity of the subdivision.

Construction of watertight bulkheads

9.—(1) Every portion of the ship required by these Regulations to be watertight shall be constructed in accordance with such of the requirements of Section 1 of Schedule 4 in Merchant Shipping Notice MSN 1698 (M) as apply to it.

(2) All tanks forming part of the structure of the ship and used for the storage of oil fuel or other liquids including double bottoms, peak tanks, settling tanks and bunkers shall be of a design and construction adequate for that purpose.

Collision, machinery space and afterpeak bulkheads and shaft tunnels

10.—(1) Every ship shall be provided with a collision bulkhead which shall be watertight up to the bulkhead deck and shall be fitted at a distance from the ship's forward perpendicular of not less than 5 per cent of the length of the ship and not more than 3.0 metres plus 5 per cent of such length.

(2) Where, in a ship constructed on or after 1st September 1984, any part below the waterline extends forward of the forward perpendicular, the distances specified in paragraph (1) shall be measured from a point either—

- (a) at the mid-point of the maximum length forward of the forward perpendicular of such an extension;
- (b) at a horizontal distance forward of the forward perpendicular equal to 1.5 per cent of the length of the ship; or
- (c) at a horizontal distance 3.0 metres forward of the forward perpendicular;

whichever gives the smallest measurement.

(3) Where a long forward superstructure is fitted, the forepeak or collision bulkhead on all passenger ships shall be extended weathertight to the next full deck above the bulkhead deck. The extension may only open forwards and shall be so arranged as to preclude the possibility of the bow door causing damage to it in the case of damage to, or detachment of, a bow door.

(4) The extension required in paragraph 3 need not be fitted directly above the bulkhead below, provided that no part of the extension is located outside of the limits specified in paragraph (1) or paragraph (2) as applicable. However, in ships constructed before 1st July 1997:

- (a) where a sloping loading ramp forms part of the extension, the part of the extension which is more than 2.3 metres above the bulkhead deck may extend no more than 1 metre forward of the forward limit specified in paragraph (1) or paragraph (2) as applicable; and
- (b) where the existing ramp does not comply with the requirements for acceptance as an extension to the collision bulkhead and the position of the ramp prevents the location of such extension within the limits specified in paragraph (1) or paragraph (2), as applicable, the extension may be situated within a limited distance aft of the aft limit specified in paragraph (1) or paragraph (2) as applicable. The limited distance aft should be no more than is necessary to ensure non-interference with the ramp. The extension to the collision bulkhead shall comply with the requirements of paragraph (3) and shall be so arranged as to preclude the possibility of the ramp causing damage to it in the case of damage to, or detachment of, the ramp.

(5) Ramps not meeting the requirements of paragraph (4) shall be disregarded as an extension of the collision bulkhead.

(6) Every ship shall be provided with a watertight afterpeak bulkhead and with watertight bulkheads dividing the space appropriated to the main and auxiliary propelling machinery, and boilers, if any, from other spaces. Such bulkheads shall be watertight up to the bulkhead deck provided that the afterpeak bulkhead may be stepped below the bulkhead deck if the safety of the ship as regards subdivision is not thereby impaired.

(7) The stern gland of every ship shall be situated in a watertight shaft tunnel or other watertight space separate from the stern tube compartment and of such a volume that if the tunnel or space is flooded the bulkhead deck will not be submerged. The stern tube shall be enclosed in a watertight compartment of moderate volume.

Double bottoms

11.—(1) Every ship shall be fitted with a watertight double bottom which shall extend from the forepeak bulkhead to the afterpeak bulkhead, as far as this is practicable, provided that a double bottom may be dispensed with in compartments where its fitting would not be compatible with the design and proper working of the ship, subject to the following minimum requirements for fitting such a double bottom—

- (a) in ships of 50 metres but less than 61 metres in length, a double bottom shall extend from the machinery space to the collision bulkhead or as near to that bulkhead as is practicable;
- (b) in ships of 61 metres but less than 76 metres in length, a double bottom shall extend from the collision bulkhead to the afterpeak bulkhead or as near to those bulkheads as is practicable, but not necessarily in the machinery space; and

(c) in ships of 76 metres in length or over, a double bottom shall be fitted amidships and shall extend from the collision bulkhead to the afterpeak bulkhead or as near to those bulkheads as is practicable.

(2) Any ship of Class II or II(A) may be exempted by the Secretary of State from the requirements for a double bottom in any portion of the ship which is subdivided by application of a factor of subdivision not exceeding 0.5 if it can be shown that the fitting of a double bottom in that portion of the ship would not be compatible with the design and proper working of the ship.

(3) When a double bottom is required by this regulation to be fitted, its moulded depth shall be of a satisfactory height and the inner bottom shall be continued out to the ship's sides in such a manner as to protect the bottom to the turn of the bilge. The inner bottom shall be deemed to be adequate for this purpose if the line of intersection of the outer edge of the margin plate with the bilge plating is not lower at any point than a horizontal plane passing through the point of intersection with the frame line amidships of a transverse diagonal line inclined at 25 degrees to the base line and cutting it at a point one-half of the ship's moulded breadth from the centreline.

(4) Wells constructed in the double bottom for the purpose of drainage shall not be larger nor extend downwards more than is necessary for such purpose. The depth of the well shall in no case be more than the depth of the double bottom at the centre line, less 460 millimetres, nor shall the well extend below the horizontal plane referred to in paragraph (3), provided that a well extending to the outer bottom may be constructed at the after end of a watertight shaft tunnel fitted in accordance with regulation 10(3).

(5) Wells for purposes other than drainage shall not be constructed in the double bottom. A ship may be exempted from the requirements of this paragraph in respect of any well if it can be shown that it will not diminish the protection given by the double bottom.

(6) Nothing in this regulation shall require a double bottom to be fitted in way of watertight compartments of moderate size used exclusively for the carriage of liquids if the safety of the ship will not be impaired in the event of bottom or side damage by reason of the absence of a double bottom in that position.

Weather deck

12.—(1) The bulkhead deck or a deck above the bulkhead deck shall be weathertight. All openings in an exposed weathertight deck shall have coamings of adequate height and strength and shall be provided with efficient and rapid means of closing so as to make them weathertight. Freeing ports, open rails and scuppers shall be fitted as necessary for rapidly clearing the weather deck of water under all weather conditions.

(2) In passenger ships constructed on or after 1st July 1997, the open end of air pipes terminating within a superstructure shall be at least 1 m above the waterline when the ship heels to either an angle of 15 degrees, or the maximum angle of heel during intermediate stages of flooding, as determined by direct calculation, whichever is the greater. Alternatively, air pipes from tanks other than oil tanks may discharge through the side of the superstructure. The provisions of this paragraph are without prejudice to the provisions of the Merchant Shipping (Load Lines) Rules 1968.

Partial subdivision above the bulkhead deck

13. All reasonable and practicable measures shall be taken to limit where necessary the entry and spread of water above the bulkhead deck; such measures may include partial bulkheads or webs. Where such partial watertight bulkheads and webs are fitted on the bulkhead deck, above or in the immediate vicinity of main subdivision bulkheads, they shall have watertight shell and bulkhead deck connections so as to restrict the flow of water along the deck when the ship is heeled in a damaged condition. Where such partial watertight bulkheads do not coincide with the bulkheads below, the bulkhead deck between shall be made effectively watertight.

Openings in watertight bulkheads

14.—(1) The number of openings in watertight bulkheads shall be reduced to the minimum compatible with the design and proper working of the ship and means shall be provided for satisfactorily closing these openings.

- (a) (2) (a) Every tunnel above the double bottom, if any, whether for access from the crew space to the machinery space, for piping or for any other purpose, which passes through such a bulkhead shall be watertight;
- (b) The means of access to at least one end of such a tunnel, if it may be used as a passage at sea, shall be through a trunkway extending watertight to a height sufficient to permit access above the bulkhead deck;
- (c) The means of access to the other end of the tunnel shall be through a watertight door;
- (d) No tunnel shall extend through the first subdivision bulkhead abaft the collision bulkhead.

- (a) (3) (a) Within spaces containing the main and auxiliary propelling machinery including boilers serving the needs of propulsion and all permanent bunkers, not more than one doorway, apart from the doorways to shaft tunnels, may be fitted in each main transverse bulkhead;
- (b) Where two or more shafts are fitted, the tunnels shall be connected by an inter-communicating passage;
- (c) There shall be only one doorway between the machinery space and tunnel spaces where one or two shafts are fitted and only two doorways where there are more than two shafts;
- (d) All such doorways shall be located so as to have their sills as high as practicable.

(4) Doorways, manholes and access openings shall not be fitted in the collision bulkhead below the bulkhead deck of any ship or in any other bulkhead which is required by these Regulations to be watertight and which divides a cargo space from another cargo space or from a permanent or reserve bunker: Provided that any ship may be permitted to fit doorways in bulkheads dividing two between-deck cargo spaces if—

- (a) the doorways are necessary for the proper working of the ship;
- (b) the number of such doorways in the ship is the minimum compatible with the design and proper working of the ship, and they are fitted at the highest practicable level; and
- (c) the outboard vertical edges of such doorways are situated at a distance as far as practicable from the ship's shell plating and in no case less than one-fifth of the breadth of the ship, such distance being measured at right angles to the centre line of the ship at the level of the deepest subdivision load water line,

provided also that in ships constructed on or after 1st September 1984 carrying goods vehicles and accompanying personnel, doorways may be fitted in bulkheads dividing cargo spaces at any level, subject to compliance with regulation 19(1).

(5) Bulkheads in spaces that do not contain machinery and are required by these Regulations to be watertight shall not be pierced by openings which are capable of being closed only by portable bolted plates.

- (a) (6) (a) In every ship—
 - (i) valves not forming part of a pipe system shall not be fitted in any bulkhead or other division required by these Regulations to be watertight;
 - (ii) if any such bulkhead or other division is pierced by pipes, scuppers, electric cables or other similar fittings, provision shall be made which will ensure that its watertightness is not thereby impaired;

- (iii) lead or other heat sensitive materials shall not be used in systems which penetrate watertight subdivision bulkheads where deterioration of such systems in the event of fire would impair the watertight integrity of the bulkheads; and
 - (iv) in ships constructed on or after 1st September 1984, valves which are fitted in piping systems to maintain the integrity of the watertight bulkheads in the event of damage, should be screw-down valves capable of being controlled manually at the valve, and from a position above the bulkhead deck.
- (b)
- (i) The collision bulkhead of a ship shall not be pierced below the bulkhead deck by more than one pipe: Provided that if the forepeak in such a ship is divided to hold two different kinds of liquids the collision bulkhead may be pierced below the bulkhead deck by not more than two pipes;
 - (ii) Any pipe which pierces the collision bulkhead of such a ship shall be fitted with a screw-down valve capable of being operated from above the bulkhead deck, the valve chest being secured to the forward side of the collision bulkhead;
 - (iii) This valve may be fitted on the after side of the collision bulkhead if it is readily accessible under all service conditions and the space in which it is located is not a cargo space.

Openings in the shell plating below the bulkhead deck

15.—(1) The number of sidescuttles, scuppers, sanitary discharges and other openings in the shell below the bulkhead deck shall be the minimum which is compatible with the design and proper working of the ship.

(2) The arrangements for closing every such opening below the bulkhead deck shall be consistent with its intended purpose and shall be such as will ensure watertightness.

(3) The design and arrangements of openings in the shell plating below the margin line shall be in accordance with the specifications set out in Schedule 10 in Merchant Shipping Notice MSN 1698 (M).

- (a) (4) (a) In all ro-ro passenger ships, scuppers shall be fitted in special category spaces so as to ensure that water which may otherwise accumulate by operation of the fixed pressure water-spraying system is rapidly discharged directly overboard.
- (b) In all ro-ro passenger ships, discharge valves for scuppers leading from special category spaces which are fitted with positive means of closing operable from a position above the bulkhead, in accordance with regulation 15(3), shall be kept open when the ship is at sea.

Side and other openings above the bulkhead deck

16.—(1) Sidescuttles, windows, gangway ports, cargo ports, bunkering ports and other openings in the shell above the bulkhead deck and their means of closing shall be of efficient design and construction and of sufficient strength having regard to the spaces in which they are fitted and to their positions relative to the deepest subdivision load waterline and to the intended service of the ship. All sidescuttles and windows shall be designed and constructed to standards recognised by the Certifying Authority.

(2) Efficiently hinged deadlights, which can be easily closed and secured watertight shall be provided for all sidescuttles to spaces below the first deck above the bulkhead deck.

(3) Each discharge led through the shell above the bulkhead deck from a space below the freeboard deck or from within any enclosed superstructure or from within any deckhouse on the freeboard deck which is fitted with weathertight doors, shall be fitted in compliance with the

requirements of paragraph 2(2) of Schedule 10 in Merchant Shipping Notice MSN 1698 (M) with efficient means for preventing water from passing inboard.

Construction and testing of watertight doors

17. Every door required to be watertight shall be of such design, material and construction as will maintain the integrity of the watertight bulkhead in which it is fitted. Any such door shall, together with its frame, be made of cast or mild steel and comply with the specifications set out in section 2 of Schedule 4 in Merchant Shipping Notice MSN 1698 (M).

Construction and testing of watertight decks, trunks etc.

18.—(1) Watertight decks, trunks, tunnels, duct keels and ventilators shall be of the same strength as watertight bulkheads at corresponding levels. The means used for making them watertight, and the arrangements adopted for closing openings in them, shall be to the satisfaction of the Certifying Authority. Watertight ventilators and trunks shall be carried at least up to the bulkhead deck.

(2) Where a ventilation trunk passing through a structure penetrates the bulkhead deck, the trunk shall be capable of withstanding the water pressure that may be present within the trunk, assuming that the maximum heel angle allowable during intermediate stages of flooding shall be the angle specified in Schedule 1 of Merchant Shipping Notice MSN 1698 (M).

(3) Where all or part of the penetration of the bulkhead deck is on the main ro-ro deck, the trunk shall be capable of withstanding impact pressure due to internal water motions (sloshing) of water trapped on the ro-ro deck.

(4) In ships constructed before 1st July 1997, the requirements of paragraph (2) shall apply not later than the date of the first periodic survey after 1st July 1997 or the date on which these Regulations come into force whichever is later.

(5) After completion, a hose or flooding test shall be applied to watertight decks and a hose test to watertight trunks, tunnels and ventilators.

Ships carrying goods vehicles and accompanying personnel (watertight doors) Requirements for ships constructed on or after 1st September 1984

- (a) 19. (1) (a) In every ship designed or adapted for the carriage of goods vehicles and accompanying personnel, hinged, rolling or sliding watertight doors may be fitted at any level in watertight bulkheads dividing cargo spaces intended for such vehicles, if the total number of passengers, including the personnel accompanying the goods vehicles, which the ship is intended to carry does not exceed—

$$N = 12 + \frac{A}{25}$$

where

A is the total deck area in square metres available in any spaces for the stowage of goods vehicles which has a clear height of not less than 4 metres and has a clear height at the entrance or access of not less than 4 metres; provided that in calculating A any part of any space which does not have a clear height of 4 metres and any part of space, of whatever height, which does not have a clear height at the entrance or access of 4 metres shall be excluded from the calculation.

- (b) Every watertight door fitted in accordance with this regulation shall comply with the requirements of paragraph 10 of Section 3 of Schedule 4 in Merchant Shipping Notice MSN 1698 (M) and every such door shall be connected with an indicator on the navigating bridge showing when the door is closed and all door fastenings are secured.

(2) In applying sub-paragraph (1)(1) of Schedule 1 in Merchant Shipping Notice MSN 1698 (M) for the worst operating condition, the permeability of cargo spaces used for the stowage of containers shall be derived by calculation in which the containers shall be assumed to be non-watertight and their permeability taken as 65 per cent. For ships which are dedicated to a particular trade or trades the actual value of permeability for the containers may be applied. In no case shall the permeability of the cargo spaces in which the containers are carried be taken as less than 60 per cent.