

# **PART 3**

## **WATERTIGHT AND WEATHERTIGHT INTEGRITY**

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**INTEGRITY**

<b>SECTION</b>	<b>SUBJECT</b>
<b>3.1</b>	<b>Doors, hatchways, and coamings</b>
<b>3.2</b>	<b>Air pipes</b>
<b>3.3</b>	<b>Ventilators (decked vessels)</b>
<b>3.4</b>	<b>Portlights</b>
<b>3.5</b>	<b>Skylights</b>
<b>3.6</b>	<b>Windows</b>
<b>3.7</b>	<b>Exhaust outlets (through hull)</b>
<b>3.8</b>	<b>Sea inlets and discharges</b>
<b>3.9</b>	<b>Freeboard</b>
<b>3.10</b>	<b>Water freeing arrangements</b>
<b>3.11</b>	<b>Watertight subdivision</b>

## **WATERTIGHT AND WEATHERTIGHT INTEGRITY**

### **Section 3.1 - Doors, hatchways, and coamings**

- 3.1.1 All openings through which water may enter and endanger the vessel should be kept to a minimum and be provided with effective closing arrangements.
- 3.1.2 Weathertight doors and hatch covers should be of efficient construction, adequately framed, and fitted with gaskets and securing arrangements.
- 3.1.3 Entrance doors to deckhouses and other superstructures giving access to openings in the working deck should be constructed weathertight.
- 3.1.4 Doorways giving direct access to spaces located below the working deck are to be fitted with a permanent coaming 300mm in height above the deck. Doorways should be located as close as practicable to the centreline of the vessel, hinged out or forward against the weather and to be operable from both sides. Where a sliding door is proposed, details are to be submitted for approval.
- 3.1.5 Hatchways should be fitted with substantial coamings, complete with all necessary fittings and covers to ensure weathertight closure. Hatch covers and coamings are to be of strength equivalent to that of the surrounding deck or structure.
- 3.1.6 To prevent seizure, hinge pins, bushes, screw clips and securing nuts of doors, hatch covers, ventilator and air pipe closures, should be of stainless steel or other corrosion-resistant material and fitted with adequate lubricating points, where applicable.
- 3.1.7 The height of hatch coamings above the working deck is not to be less than 300mm, excepting that where essential for fishing operations, such as warp leads to winches, etc., and for safe working on restricted decks, the coamings may be reduced in height or omitted, subject to the requirements for flush deck hatches and to the approval of the Surveyor.
- 3.1.8 Main access hatches should normally be 600mm x 600mm clear opening. Where space is restricted, hatches may have a minimum clear opening of 500mm x 500mm at the discretion of MCA or Fishing Vessel Certifying Authority. See Section 11.11 for escape arrangements.
- 3.1.9 For vessels less than 10m LOA, access hatches to unmanned spaces other than engine spaces may be of a reduced size, but in no case less than 500mm x 380mm, providing access is not required for any essential operation e.g. valve closure.
- 3.1.10 Hatch covers should preferably be secured by hinges on the forward side or otherwise permanently attached to the structure of the vessel by means of wire or chain.

- 3.1.11 Flush deck hatches are to be rigid in construction and secured by positive means such as recessed dog clips. A permanent notice is to be fitted on the hatch or in a visible location in close proximity stating “**HATCH TO BE KEPT CLOSED AT SEA**”.
- 3.1.12 Flush type hatches and ice scuttles are to have the covers permanently attached to the hull structure by means of hinges, wire or chain and are to be capable of being closed weathertight.
- 3.1.13 Where drain pipes are fitted from recessed channels of flush hatches to discharge at ship sides, shut-off valves should be fitted at the hull side and must be accessible. The requirement for a non-return valve shall not apply to such drains.
- 3.1.14 The shut-off valve may be omitted if the hatch drain discharge pipe is located above the design waterline, and the drain pipe is of equivalent material and thickness to that of the hull, and permanently moulded, or welded in place without separable joints.
- 3.1.15 It is recommended that access, loading, and discharge hatches on the working deck that are likely to be opened at sea, should be positioned on the centreline where practicable.
- 3.1.16 Propeller inspection tubes are to meet the freeboard requirements for the vessel, and are to be fitted with a permanent attached means of watertight closure.

### **Section 3.2 - Air pipes**

- 3.2.1 The lowest point at which water might gain access through an air pipe should be not less than 760mm above the exposed freeboard deck or less than 450mm above the exposed superstructure deck. The exposed portion of the air pipes should be of substantial construction.
- 3.2.2 A reduced height may be accepted if it can be shown that the rule air pipe height would interfere with essential operations and provided that an adequate height above the deck is maintained.
- 3.2.3 Air pipes should be provided with an efficient means of watertight closure and provision should be made to prevent overpressure or vacuum occurring when the tanks are filled or emptied.
- 3.2.4 On vessels of metal construction all air pipe/deck connections are to be by a welded through socket or welded pad of adequate thickness.
- 3.2.5 The open ends of tank air pipes are to be provided with a proprietary type ball float fitting or a gooseneck fitted with an automatic means of closure. Where the pipe internal diameter is 25mm or less, alternative arrangements may be considered.

### **Section 3.3 - Ventilators (decked vessels)**

- 3.3.1 Ventilators should be of substantial and efficient construction and be provided with a permanently attached means of weathertight closure.
- 3.3.2 For all monohulls, the height above deck of each ventilator should not be less than 760mm to the lowest point where water might gain access. For catamarans between 10m to 15m LOA, the height above deck should not be less than 600mm to the lowest point where water may gain access, catamarans less than 10m LOA, the height should be as high as practical but in no case less than 450mm.
- 3.3.3 Ventilators which must be kept open, e.g. for the supply of air to machinery or for the discharge of noxious or flammable gases, should be specially considered with respect to its location and height above deck.
- 3.3.4 Engine rooms are to be adequately ventilated to meet the engine Manufacturer's recommendations for engine air supply and exhaust requirements. Where auxiliary engines are fitted, extra ventilation is to be provided to ensure sufficient total air capacity for both engines. Where electric ventilation fans are provided to the engine space, a means of stopping the fans, operable from outside the engine space, must be provided.

### **Section 3.4 - Portlights**

- 3.4.1 All portlights where fitted to superstructures, deckhouses and other weathertight structures, are to be fitted with hinged deadlights capable of being closed weathertight. Any port lights and deadlights fitted are to be equivalent in strength to the surrounding structure.
- 3.4.2 Portlights should not be fitted in the hull below the working (freeboard) deck, nor in engine casings.
- 3.4.3 Portlights fitted within an enclosed superstructure are to be fitted at a minimum height of 1m to the centre above the working deck, except those used for escape which may be lower subject to Surveyor's approval.
- 3.4.4 Any opening portlight should not exceed 250mm diameter or equivalent area, except where the portlight has been approved as a means of escape.
- 3.4.5 Glazing thicknesses should meet the requirements of ISO 12216 or other equivalent Standard.

### **Section 3.5 - Skylights**

- 3.5.1 Skylights leading to spaces below the working deck are to be of substantial construction and capable of being closed weathertight, operable from both sides, positioned clear of deck working areas, and fitted on or as near to the centreline as possible, and are to be mounted on substantial coamings of equivalent strength to the surrounding deck and as high as practicable.
- 3.5.2 Skylight glazing should meet the requirements of ISO 12216 or an equivalent standard.
- 3.5.3 Glass inserts, where fitted, are to have the framing material and fastenings of equivalent strength to the surrounding structure, and are to be protected against damage from warps and gear.
- 3.5.4 Skylights should not be fitted in machinery spaces perimeters, working decks or other vulnerable positions. Where skylights are provided as a means of escape, they should be positioned clear of obstructions to enable rapid and easy access and be clearly marked “**EMERGENCY EXIT**”.

### **Section 3.6 - Windows**

- 3.6.1 Windows are not to be fitted in the hull of any vessel.
- 3.6.2 Windows fitted in superstructures of decked or partially decked vessels of 7m LOA and over, are to be to ISO 12216 or other equivalent standard and fitted in metal frames, or frames of equivalent strength to that of surrounding material, rubber framed windows are not permitted. Where windows are bonded to the surrounding structure of GRP vessels, the fixing method is to be compliant with ISO 12216 or other equivalent standard.
- 3.6.3 Where the wheelhouse entrance does not open to the outside deck, at least one window fitted in the wheelhouse is to be of the opening type arranged to permit a means of escape, as described in Part 11, Section 11.11.
- 3.6.4 Opening windows may be hinged, vertically or horizontally sliding types, provided that the window can be readily and efficiently secured in the closed position.
- 3.6.5 Vertical sliding windows are to be fitted with adequate drainage arrangements discharging to the open deck, where practicable.
- 3.6.6 Polarised or tinted glass or glazing material susceptible to scratching must not be fitted at the helm or control position, where required for navigational visibility.

### **Section 3.7 - Exhaust outlets (through hull)**

- 3.7.1 Exhaust pipes that penetrate the hull below the freeboard deck are to be fitted with a non-return valve, device, or flap to prevent the ingress of water at the outlet position.
- 3.7.2 The lower edge of the discharge is to be a minimum of 100mm above the design load waterline. Alternative arrangements are to be submitted for approval prior to installation.
- 3.7.3 The non-return device referred to in Paragraph 3.7.1 may be a proprietary fitting, water trap, built in valve, or an inverted "U" bend, fitted in the exhaust line.
- 3.7.4 Materials for exhaust systems see Part 8, Paragraphs 8.1.9 & 8.1.10.

### **Section 3.8 - Sea inlets and discharges**

- 3.8.1 All sea inlets and overboard discharges penetrating the hull below the working or freeboard deck are to be provided with a shut-off valve or cock. Those fitted within machinery spaces or below the design waterline are to be of metal or other approved type. If valves are used other than metal, a certificate attesting to their classification must be supplied from a recognised body.
- 3.8.2 In open vessels, discharges are to be no less than 300mm above the design waterline.
- 3.8.3 In addition to the requirements of Paragraph 3.8.1, overboard discharges - other than toilet discharges - located below the weathertight or freeboard deck, are to be fitted with a non-return valve, which may be incorporated within the shut-off valve. Discharges located 300mm above the waterline and are <40mm inside diameter, are to be fitted with either a shut-off valve or non-return valve.
- 3.8.4 Valves and cocks fitted in metal hulls are to be connected to substantial pads welded to the hull plating, or to a welded-in short distance piece, to clear side or bottom stiffeners. Distance pieces, where fitted, are to have a wall thickness of at least the thickness of the connecting hull plating.
- 3.8.5 Valves and cocks in wood or GRP hulls are to be fitted and spigoted into a suitable pad and secured with an external non-corrodible ring under the bolts. Fittings up to 50mm diameter may be attached with threaded spigot pieces having an external collar and internal nut, provided that suitable hull reinforcement is provided where necessary. Those fitted within machinery spaces are to be of metal or other approved type.
- 3.8.6 Sea inlet and discharge valves are to be accessible for operation at all times, if necessary, by extended spindles or wire pulls to above the floor plating or above deck. See Part 9, Section 9.1.

- 3.8.7 Sea inlet and overboard discharge valves are to be clearly labelled, indicating function, and open and closed position.
- 3.8.8 Water feeds to stern glands are to be fitted with a shut-off valve at the gland.

### **Section 3.9 - Freeboard**

- 3.9.1 Open vessels are to have a minimum freeboard measured down from the lowest point of gunwale top to the design waterline. Freeboard measurements are to be not less than 400mm for a vessel of 7m LOA or less and 700mm for a vessel of 15m LOA. For a vessel of intermediate length the clear height should be determined by linear interpolation.
- 3.9.2 All vessels less than 7m LOA and open vessels are to be limited in their area of operation, to 20 miles from a safe haven and in favourable weather conditions.
- 3.9.3 All vessels less than 7m LOA and open vessels are to be fitted with a notice visible at the helm position stating the limited area of operation.
- 3.9.4 Decked vessels with a continuous watertight weatherdeck are to have a minimum freeboard from the design waterline of not less than 300mm. Freeboard is to be measured from the waterline to the lowest point of the deck at side.
- 3.9.5 Decked vessels with freeboard less than 300mm are to be limited in their area of operation to 20 miles from a safe haven and in favourable weather conditions and to be fitted with a visible notice as per Paragraph 3.9.3.

### **Section 3.10 - Water freeing arrangements**

#### **Open Vessels**

- 3.10.1 The following provisions should apply:-
- 3.10.2 The height of any door sill above the fixed sole level in open type vessels should be as high as practical, but no less than 200mm. If hinged, the door should open outwards.
- 3.10.3 Sole drainage on open vessels is to be given careful consideration. The level of the floor should not be positioned at such a height that it would have an adverse effect on the stability of the vessel, the following shall apply:-
  - (i) There should be effective drain openings fitted on each side of the sole to enable any water to drain directly to the bottom of the vessel. In the case of a vessel with a sealed sole, an aft sump is to be fitted, extending from the keel to sole;



- (ii) It is recommended that the drainage area be at least 2% of the total bulwark area above the sole;
- (iii) Open vessels are not to be fitted with freeing ports;
- (iv) Any barrier or coaming which may be fitted to the sole to prevent the entry of rain water to the bottom of the vessel should not be at a height any greater than 25mm above the level of the sole;
- (v) The bilge pumping intake should be at a readily accessible position;
- (vi) Sole support structures that form buoyancy spaces are to be sealed, and surfaces that may come into contact with water are to be sealed with gel coat or similar.

3.10.4 Open type vessels are to be fitted with bilge pumps as required by Section 9.3 of these Standards.

#### **Decked vessels**

3.10.5 On decked vessels, where the fixed bulwarks, ends or sides of superstructures etc., form enclosed wells, means to clear entrapped water are to be provided and may comprise any, or any combination, of the following:-

- (i) Freeing ports with an attached means of closing (see Paragraph 3.10.14 regarding restrictions to this arrangement);
- (ii) Permanent openings in the bulwarks such as slots;
- (iii) Apertures in and under bulwark or stern ramp doors;
- (iv) Deck scuppers where the discharge is above the load waterline.

3.10.6 The minimum area for freeing ports on each side of the well or deck is to be not less than 3% of the total bulwark area each side. Where monohull length/breadth ratios are greater than 2.5 then an additional 1% is required in freeing port area each side

3.10.7 Where vessels are fitted with full or partial shelters which are left open at the stern, and where the passage of water forward is not restricted by watertight bulkheads, the freeing port area is to be increased by 1% over the requirement stated in Paragraph 3.10.6.

3.10.8 Freeing ports are to be arranged throughout the length of the bulwark or well to provide maximum drainage under all normal conditions. At the discretion of the attending Surveyor, up to one third of the freeing port area required at each side may be located in the transom bulwark, with the vessel centreline dividing the port and starboard side allocation. Where the freeing port area in the transom bulwark is greater than the maximum one third allowance per side, the excess area shall not be included in the total freeing port area provided.

- 3.10.9 The means of clearing water must not provide easy access for water to enter the enclosed deck space.
- 3.10.10 Any freeing port or slot in the bulwark is to have the bottom edge as close to the deck as possible. Freeing ports greater than 230mm in depth and wider than 350mm are to be fitted with bars.
- 3.10.11 Where freeing ports are fitted with hinged flaps or shutters, sufficient clearance to prevent jamming is to be provided and hinges are to be fitted with pins of non-corrodible material. Greasing points or nipples are to be provided where practicable.
- 3.10.12 Freeing ports are to be arranged throughout the length of the bulwark or well to provide maximum drainage under all normal conditions of trim.
- 3.10.13 Care is to be taken that deck pounds, machinery and net or gear stowage will not impede the free flow of trapped water to the freeing ports or slots.
- 3.10.14 Lift-up closing appliances should not be fitted to freeing ports, or locking devices fitted to freeing port flaps, if they reduce the total freeing port area along either side of the vessel below the freeing port requirement. They will only be considered acceptable where the remaining open freeing port area meets the requirement when the appliances are closed.

### **Section 3.11 - Watertight subdivision**

- 3.11.1 All vessels below 7m LOA are to be fitted with at least one watertight bulkhead positioned according to the vessel's arrangement where it will be most effective to prevent flooding when in a damaged condition. Those fitted with sealed decks are to comply with Part 9, Paragraph 9.3.17.
- 3.11.2 All vessels between 7m and 10m LOA are to be fitted with at least two watertight bulkheads. A collision bulkhead is to be positioned forward at a point no less than 0.5m and no greater than 1m from the stem, measured at the design waterline. A second bulkhead is to be positioned to separate the machinery space from the fish hold or accommodation spaces.
- 3.11.3 All vessels between 10m and 15m LOA are to be fitted with at least three watertight bulkheads. A collision bulkhead is to be positioned forward at a point no less than 0.75m and no greater than 2m from the stem, measured at the design waterline. The second and third watertight bulkheads should be positioned at each end of the engine room. Vessels with engines mounted forward where the collision bulkhead is the forward engine room bulkhead, should have a bulkhead positioned aft of the engine space and aft of the fish hold (aft peak bulkhead).
- 3.11.4 Where a vessel is of a catamaran design, a longitudinal watertight bulkhead is to be fitted between hulls to separate main engine compartments.

- 3.11.5 Where it is intended for a bulkhead to be fitted outside the stipulated parameters, details should be submitted for approval prior to construction.
- 3.11.6 In decked vessels, the collision bulkhead should extend from the keel or forefoot to the first weathertight deck, or to a flat located no lower than 300mm above the estimated deepest operational waterline (collision tank). Bulkheads in other positions should extend full height from the keel to the deck.
- 3.11.7 Vessels fitted with collision tanks as detailed in Paragraph 3.11.6 with accommodation fitted forward of the vertical bulkhead, will be restricted to 24 hours at sea with no crew permitted to be living on board in port.
- 3.11.8 Access to the compartment forward of the collision bulkhead may be by a bolted watertight cover or watertight hatch normally closed at sea.
- 3.11.9 Doors should not normally be fitted in watertight bulkheads, but where these are necessary for the safe operation of the vessel, the doors are to be permanently attached to the bulkhead and are to be of equivalent strength to the unpierced bulkhead. Doors are to be watertight and capable of operation from both sides, and fitted with signs stating **“TO BE KEPT CLOSED AT SEA”**.
- 3.11.10 Where pipes and electrical cables are carried through a watertight bulkhead, the method of penetration must maintain the watertight integrity of the bulkhead.
- 3.11.11 For vessels 7m LOA and greater, where it is intended that a watertight compartment is to be sealed to omit the need for bilge pumping, Part 9, Paragraph 9.3.17 should be consulted.