

SECTION 8

BULKHEADS STRUCTURE

1 General

1.1 Application

1.1.1 The requirements of this Section apply to longitudinal or transverse bulkhead structures.

1.2 General

1.2.1 Bulkheads may be horizontally or vertically stiffened. Horizontally framed bulkheads consist of horizontal ordinary stiffeners supported by vertical primary supporting members.

Vertically framed bulkheads consist of vertical ordinary stiffeners which may be supported by horizontal girders.

1.2.2 The number and location of watertight bulkheads are to be in accordance with the relevant requirements of damage stability criteria, when applicable, as defined in Part B, Chapter 3.

1.2.3 The structural continuity of the bulkhead vertical and horizontal primary supporting members with the surrounding supporting hull structures is to be carefully ensured.

1.2.4 As a rule, openings may not be cut in the collision bulkhead below the freeboard deck^(m). (Refer also to Ch 2, Sec 1, [2]).

The number of openings in the collision bulkhead above the freeboard deck^(m) is to be kept to the minimum compatible with the design and proper working of the yacht.

All such openings are to be fitted with means of closing to weathertight standards.

1.2.5 Certain openings below the freeboard deck^(m) are permitted in the other bulkheads, but these are to be kept to a minimum compatible with the design and proper working of the yacht and to be provided with watertight doors having strength such as to withstand the head of water to which they may be subjected.

1.2.6 The transverse bulkheads are to be stiffened in way of deck girders by vertical stiffeners in line with the deck girder or by an equivalent system. Where the deck girder is not continuous, the vertical stiffener supporting the end of the deck girder is to be strong enough to sustain the bending moment at end of the deck girder.

2 Structural arrangement

2.1 Watertight bulkheads

2.1.1 The crossing of transverse watertight bulkheads and bottom, side shell or deck longitudinal stiffeners are to be fitted with watertight collar plates.

2.1.2 Ordinary stiffeners of watertight bulkheads are to end in way of hull structure members, and are to be fitted with end brackets.

2.1.3 Where requirement of [2.1.2] is made not possible by hull lines, any other solution may be accepted provided the embedding of bulkhead ordinary stiffeners is satisfactorily achieved.

2.1.4 The ordinary stiffeners of watertight bulkheads may be snipped at ends in the tweendecks, provided their scantlings is increased accordingly.

2.1.5 Watertight bulkheads are to be fitted with watertight doors in way of passage.

2.1.6 The thickness of watertight doors is to be not less than that of the adjacent bulkhead plating, taking account of their actual spacing.

2.1.7 Where vertical stiffeners are cut in way of watertight doors, reinforced stiffeners are to be fitted on each side of the door and suitably overlapped; cross-bars are to be provided to support the interrupted stiffeners.

2.2 Non-tight bulkheads

2.2.1 Non-tight bulkheads not acting as pillars are to be provided with vertical stiffeners with a maximum spacing equal to:

- 0,9 m, for transverse bulkheads
- two frame spacings, with a maximum of 1,5 m, for longitudinal bulkheads.

2.2.2 As a rule, the total area of openings in wash bulkheads fitted in tanks is to be between 10% and 30% of the total area of the wash bulkhead.

2.3 Bulkheads acting as pillars

2.3.1 Non-tight bulkheads acting as pillars (i.e. those that are designed to sustain the loads transmitted by a deck structure) are to be provided with vertical stiffeners with a maximum spacing equal to:

- two frame spacings, when the frame spacing does not exceed 0,75 m
- one frame spacing, when the frame spacing is greater than 0,75 m.

2.3.2 A vertical stiffening member is to be fitted on the bulkhead, in line with the deck primary supporting member transferring the load from the deck to the bulkhead.

This vertical stiffener, in association with a width of plating equal to 35 times the plating thickness, is to comply with the applicable requirements for pillars, the load supported being determined in accordance with the same requirements.

2.4 Bracketed ordinary steel stiffeners

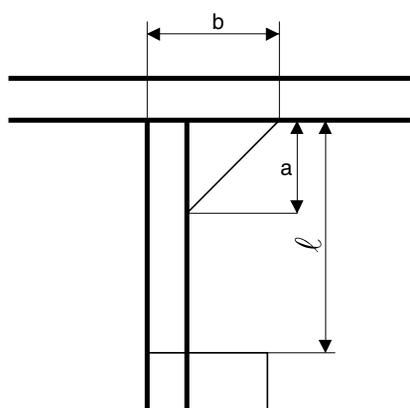
2.4.1 Where bracketed ordinary stiffeners are fitted, the arm lengths of end brackets of ordinary stiffeners, as shown in Fig 1 and Fig 2, are to be not less than the following values, in mm:

- for arm length a:
 - brackets of horizontal stiffeners and bottom bracket of vertical stiffeners:
 $a = 100\ell$
 - upper bracket of vertical stiffeners:
 $a = 80\ell$
- for arm length b, the greater of:
 - $b = 80 \sqrt{\frac{w + 20}{t}}$
 - $b = \alpha \frac{ps\ell}{t}$

where:

- ℓ : Span, in m, of the stiffener measured between supports
- w : Section modulus, in cm^3 , of the stiffener
- t : Thickness, in mm, of the bracket
- p : Design pressure, in kN/m^2 , calculated at mid-span
- α : Coefficient equal to:
 - $\alpha = 4,9$ for tank bulkheads
 - $\alpha = 3,6$ for watertight bulkheads.

Figure 1 : Bracket at upper end of ordinary stiffener on plane bulkhead



2.4.2 The connection between the stiffener and the bracket is to be such that the section modulus of the connection is not less than that of the stiffener.

2.5 Bracketed ordinary aluminium stiffeners

2.5.1 Where bracketed ordinary stiffeners are fitted, the arm lengths of end brackets of ordinary stiffeners, as shown in Fig 1 and Fig 2, are to be not less than the following values, in mm:

- for arm length a:
 - brackets of horizontal stiffeners and bottom bracket of vertical stiffeners:
 $a = 100\ell$
 - upper bracket of vertical stiffeners:
 $a = 80\ell$
- for arm length b, the greater of:
 - $b = 90 \sqrt{\frac{w}{t}}$
 - $b = 100$

where:

- ℓ : Span, in m, of the stiffener measured between supports
- w : Section modulus, in cm^3 , of the stiffener
- t : Thickness, in mm, of the bracket

2.5.2 The connection between the stiffener and the bracket is to be such that the section modulus of the connection is not less than that of the stiffener.

Figure 2 : Bracket at lower end of ordinary stiffener on plane bulkhead

