

Specification for

Ships' side scuttles

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Foreword

This British Standard for ships' side scuttles was originally issued as BS 3024 in 1926, first revised in 1947 followed by a second revision in 1966. This third and latest revision is issued under the authority of the Shipbuilding and Marine Industry Standards Committee.

The International Conventions for the Safety of Life at Sea 1929, 1948 and 1960 and the International Convention respecting Load Lines 1930 define the types of side scuttles required in positions relative to the load line (i.e. deepest waterline), the bulkhead or freeboard deck and the first tier of superstructures above such deck, the actual construction of each type of side scuttle being left to the Administrations of the countries concerned.

The first revision of BS 3024 was evolved such that these convention requirements would be met and the construction details were set out so that the strongest type of side scuttle was required in positions nearest to the waterline and relaxations in strength were permitted as the side scuttle position became higher up in the ship.

The first revision provided only for:

- 1) side scuttles very close to the waterline;
- 2) side scuttles above the waterline but below the bulkhead or freeboard deck;
- 3) side scuttles situated in the first tier of superstructures above such deck.

The second revision provided for further reductions in strength for side scuttles in positions above those listed above. Further to meet the advancement in the design of ships, requirements for side scuttles manufactured from aluminium alloy were introduced and the specifications for the materials to be used in the manufacture of other types of side scuttles were revised.

Following upon the change to the SI system of metric units, to be taken by the Shipbuilding and Marine Industry in the United Kingdom, and upon international agreement being reached on standard metric dimensions of glass thicknesses and other components of a ship's side scuttles, a third revision of BS 3024, in metric units, was put in hand. In addition, the International Convention on Load Lines, 1966 approved a regulation that no side scuttle shall be fitted so that its sill is below a line drawn parallel to the freeboard deck at side, and having its lowest point 2.5 % of the breadth (β) above the load waterline, or 500 mm, whichever is the greater distance. As a consequence, it has been necessary to delete Tables 1 and 2 of the 1966 (imperial) edition; the remaining Tables 3 to 18 have become Table 14 to Table 29 inclusive in this revision.

This third revision of BS 3024 also incorporates the relevant agreements reached within the International Organization for Standardization (ISO), particularly the work of ISO Technical Committee TC 8, Shipbuilding details, in which the United Kingdom has taken an active part. Dimensions for the three types of side scuttles (designated Type A: heavy, Type B: medium and Type C: light) are based on the ISO Recommendation R 1751; dimensions and tolerances for side scuttle toughened glasses are based on ISO 1095 and requirements for the testing of glasses comply with ISO 614.

Although general requirements with respect to workmanship and testing are included, insofar as ships registered in the United Kingdom or requiring the approval of the Department of Trade (Marine Division) are concerned, the side scuttles have to be constructed to the satisfaction of a marine surveyor of the Department of Trade. Ships' side scuttles constructed in accordance with this British Standard will meet the requirements of the regulations stated in 1.2.

The design and scantlings of the side scuttles in this standard will normally be applicable to ships engaged on exposed sea voyages. In the case of ships on more restricted services, such modification of this standard as appears reasonable may be allowed, having regard to the intended service of the ship.

A further related standard in this Marine Series is BS MA 25 "*Ships' windows*".

This standard makes reference to the following British Standards and international publications:

BS 309, *Whiteheart malleable iron castings*.

BS 310, *Blackheart malleable iron castings*.

BS 952, *Classification of glass for glazing and terminology for work on glass*.

BS 970, *Wrought steels in the form of blooms, billets, bars and forgings*.

BS 1400, *Copper alloy ingots and copper and copper alloy castings*.

BS 1490, *Aluminium and aluminium ingots and castings*.

BS 2872, *Copper and copper alloys. Forging stock and forgings*.

BS 2874, *Copper and copper alloys. Rods and sections (other than forging stock)*.

BS 3100, *Steel castings for general engineering purposes*.

BS 1631, *Austenitic chromium-nickel steel castings for resistance to corrosion*.

BS 1632, *Austenitic chromium-nickel-molybdenum steel castings for resistance to corrosion*.

BS 3643, *ISO metric screw threads — Part 1: Thread data and standard thread series — Part 2: Limits and tolerances for coarse pitch series threads*.

BS 4360, *Weldable structural steels — Part 2: Metric units*.

ISO 614, *Shipbuilding — Non-destructive strength testing of toughened safety glasses for ships' side scuttles and rectangular windows — Punch method*.

ISO 1095, *Shipbuilding — Toughened safety glasses for ships' side scuttles*.

ISO/R 1751, *Shipbuilding details — ships' side scuttles*.

Certification. It is strongly recommended that in view of the nature of this specification, manufacturers and purchasers should make use of the certification facilities described on the inside back cover of this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 36, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

NOTE 1 Users of this British Standard: Marine Series should note that while observing the requirements of the standard they should at the same time ensure compliance with such statutory requirements, rules and regulations as may be applicable to the individual ship concerned (see also 1.2).

NOTE 2 Attention is drawn to the fact that some side scuttles are subject to letters patent.

1 General

1.1 Scope

This British Standard specifies requirements for the design (including dimensions), construction, scantlings, glazing, testing and installation of ships' side scuttles, non-opening and opening types, as follows, in positions as defined in Section 8.

- 1) Non-opening side scuttles (Table 14 and Table 15) ISO type A: heavy series with deadlight.
- 2) Non-opening and opening side scuttles (Table 16 and Table 17) ISO type B: medium series with deadlight.
- 3) Non-opening and opening side scuttles (Table 18 and Table 19) ISO type C: light series without deadlight.
- 4) Non-opening and opening side scuttles (welded) (Table 20 and Table 21) ISO type A: heavy series with deadlight.
- 5) Non-opening and opening side scuttles (welded) (Table 22 and Table 23) ISO type B: medium series with deadlight.
- 6) Non-opening and opening side scuttles (welded) (Table 24 and Table 25) ISO type C: light series without deadlight.
- 7) Non-opening and opening side scuttles (aluminium) (Table 26 and Table 27) ISO type B: medium series with deadlight.
- 8) Non-opening and opening side scuttles (aluminium) (Table 28 and Table 29) ISO type C: light series without deadlight.

1.2 Conformity with law or regulation

The purchaser shall disclose to the supplier at the time of the enquiry any statutory or other regulations with which the side scuttles are intended to comply.

Side scuttles fitted in all British merchant ships have to satisfy the requirements of the Merchant Shipping (Load Line) Rules 1968 (Statutory Instrument 1968 No. 1053), the Merchant Shipping (Passenger Ship Construction) Rules 1965 (Statutory Instrument 1965 No. 1103) and the Merchant Shipping (Cargo Ship Construction and Survey) Rules 1965 (Statutory Instrument 1965 No. 1104).

NOTE 1 For passenger ships registered in the United Kingdom the side scuttles are required to be constructed to the satisfaction of a marine surveyor of the Department of Trade.

NOTE 2 In passenger ships registered in the United Kingdom, the positions where non-opening type side scuttles are required to be fitted are laid down in the Merchant Shipping (Passenger Ship Construction) Rules 1965.

1.3 Definitions

For the purposes of this British Standard, the following definitions apply.

1.3.1

passenger ship

a ship carrying more than 12 passengers

1.3.2

bulkhead deck

the uppermost deck to which the transverse watertight bulkheads extend and where used herein refers to passenger ships only

1.3.3

datum deck

the freeboard deck in a non-passenger ship and the bulkhead deck or freeboard deck, whichever is the higher, in a passenger ship

1.3.4

freeboard deck

the deck from which the freeboards assigned to the ship are calculated, being either:

- 1) The uppermost complete deck exposed to weather and sea which has permanent means of closing all openings in its weather portions and below which all openings in the sides of the ship are fitted with means of watertight closing, or
- 2) At the request of the owner and subject to the approval of the Department of Trade or the Administration concerned, a deck lower than that described in 1) may be permitted subject to its being a complete and permanent deck which is continuous both, firstly, in a fore and aft direction at least between the machinery space and the peak bulkheads of the ship, and, secondly, athwartships. In a ship having a discontinuous freeboard deck, the lower line of the exposed deck and the continuation of that line parallel to the upper part of the deck is taken as the freeboard deck.

1.3.5

superstructure

a decked structure on the freeboard deck which entitles the ship to a reduction in freeboard. Deckhouses whose sides are within 1.5 m or 4 % of the breadth of the ship, whichever is the greater, from the ship's side, shall be treated as a superstructure without regard to allowance for freeboard

1.3.6

tiers

spaces above the higher of the bulkhead deck or freeboard deck in passenger ships or the freeboard deck in non-passenger ships

1.3.7

safety glass (general definition)

a glass which, if fractured, gives fragments which are less liable to cause severe cuts than fragments of ordinary glass

1.3.8

toughened safety glass

glass which has been converted to safety glass by subjection to a process of heating and rapid cooling so that if fractured it disintegrates into small pieces and, in addition, its liability to fracture under the action of external forces or changes of temperature is greatly reduced

1.3.9

batch

a quantity of glasses of the same size and thickness and which show a similar strain pattern when viewed by polarized light

1.3.10

subdivision load line

this is the waterline used in determining the subdivision of a passenger ship in accordance with the requirements of the Merchant Shipping (Passenger Ship Construction), Rules 1965

1.3.11

summer load line

this is a load line marked on the side of a ship indicating the maximum draught at which the ship may float when the ship is in a Summer Zone

1.3.12

summer timber load line

this is a load line marked on the side of a ship indicating the maximum draught at which the ship may float when the ship is in a Summer Timber Zone, in accordance with the regulations of the International Load Line Convention

1.3.13

right-hand ship's side scuttle

a scuttle with the hinge of the glassholder on the right side when viewed front the side towards which it opens, and the deadlight opening upwards

1.3.14**left-hand ship's side scuttle**

a scuttle with the hinge of the glassholder on the left side when viewed from the side towards which it opens, and the deadlight opening upwards

1.3.15**common hinge ship's side scuttle**

a scuttle with both the glassholder and deadlight on the same hinge pin

2 Materials**2.1 General**

The materials used in the construction of side scuttles shall comply with the requirements of **2.2** as regards chemical composition and mechanical properties. The mechanical testing of all materials specified in **2.2** shall be carried out in accordance with the mechanical test requirements of the appropriate British Standard listed.

2.2 Schedule of materials

Types	Brass	Aluminium alloys	Gunmetal	Malleable cast iron	Steel
Sand castings	BS 1400 (SCB3-C) BS 2874 (CZ 121)	BS 1490 LM5 LM6 LM25	BS 1400 LG2 LG4	BS 310 Grade B310/10 BS 309 Grade W340/3	
Die castings	BS 1400 (DCB1)				
Castings (by other methods)					BS 3100 Grade A1
Plate					BS 4360-2 Grade 43 A
Naval die castings	BS 1400 (DCB1) (DCB3)				
Wrought corrosion resistant	BS 2874 (CZ112) BS 2872 (CZ112)				BS 970 321S12 347S17 316S16
Cast corrosion resistant					BS 1631 BS 1632

3 Glasses for side scuttles**3.1 General**

Glasses for ships' side scuttles shall be in toughened safety glass. The glass shall comply with the requirements of BS 952.

3.2 Dimensions of toughened safety glass

The dimensions of glass for ships' side scuttles listed in Table 14 to Table 29 shall conform to the requirements given in Table 1 to Table 4.

3.2.1 Thickness of glasses. The thickness of glasses for ships' side scuttles for the respective types (A, B or C) shall be according to the thickness specified in Table 1.

Table 1 — Glass thicknesses and permissible head of water for ships' side scuttles

Nominal size of side scuttle, <i>D</i>	Type A		Type B		Type C	
	Glass thickness, <i>t</i>	Pressure head, <i>H</i>	Glass thickness, <i>t</i>	Pressure head, <i>H</i>	Glass thickness, <i>t</i>	Pressure head, <i>H</i>
mm	mm	m	mm	m	mm	m
200	10	32.8	8	21.0	6	11.8
250	12	30.2	8	13.4	6	7.5
300	15	32.8	10	14.6	8	9.3
350	15	24.1	12	15.4	8	6.8
400	19	29.7	12	11.8	10	8.2
450	—	—	15	14.6	10	6.5

NOTE 1 When obscured glasses are used, the same thickness is acceptable, provided the depth of sandblast treatment does not exceed 0.125 mm. It is preferable that the obscuring treatment should be applied before the glass is toughened. When obscured glass is fixed with the obscured surface facing inwards, one thickness greater than that specified in Table 1 shall be used.

NOTE 2 $H = \frac{13130t^2}{D^2}$ (m).

3.2.2 Tolerances on thickness. The tolerances on thickness shall be according to Table 2.

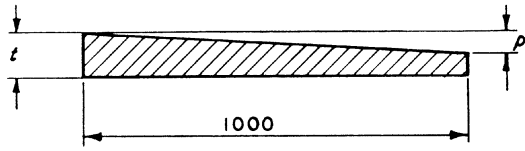
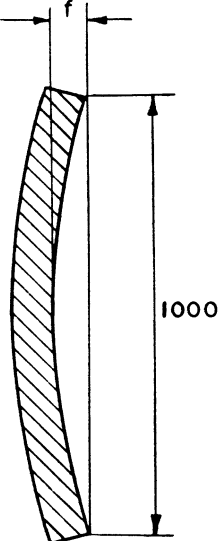
Table 2 — Thickness tolerances for glasses

	mm	mm	mm	mm
Glass thickness	6	8, 10, 12	15	19
Tolerance	± 0.2	± 0.3	± 0.5	± 1.0

3.2.3 Tolerances on diameter. Tolerances on diameters will vary with the thickness of glass and with the type of edgework (see Table 14 to Table 29, diameter of glass **d*).

3.2.4 Tolerances on flatness and parallelism of glass. The tolerances on flatness and parallelism of glasses shall be as specified in Table 3.

Table 3 — Tolerances on flatness and parallelism of glasses

Dimension		Tolerance					
		Nominal thickness of glass t , (mm)					
		6	8	10	12	15	19
Parallelism, p		mm/1 000 m 0.2	mm/1 000 m 0.2				
Flatness, f measured in the vertical plane		3.0	2.0				
Parallelism of glass according to location in ship	Cabins	0.6	0.6				
	Observation rooms and public rooms	0.2	0.2				

3.2.5 Edges of toughened safety glasses. All edges shall be finished to remove sharpness and roughness. Edges of glasses of nominal thickness over 12 mm should be ground flat with arrises or finished by some other such process, provided the finished diameter conforms to the dimensional tolerances specified in Table 14 to Table 29.

The width, s , and depth, y , of the arris should not exceed the dimensions in Table 4.

Edgework should be carried out before toughening the glass.

Table 4 — Dimensions of arris for edge of glasses

Nominal thickness of glass, t	mm	mm
	6, 8, 10	12, 15, 19
Maximum width, s	1.4	2.0
Maximum depth, y	1.0	1.0

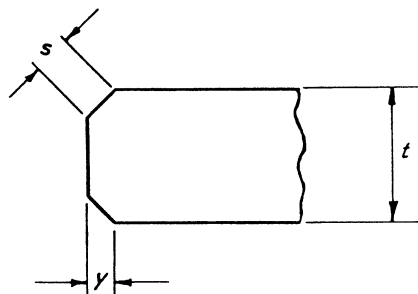


Figure 1 — Arris for edge of glass

3.3 Examination and testing of toughened glasses

3.3.1 Examination in polarized light. Each glass shall be illuminated by plane polarized light falling approximately normally on one face and examined from the opposite side through the analysing device. To ensure that the glass is properly toughened, the whole area of each glass shall be examined. A suitable apparatus is described in Appendix A.

During this examination, the glasses shall be sorted into batches of similar strain pattern for subsection to the strength test, if required, specified in 3.3.2.

3.3.2 Load stamp test. Manufacturers shall guarantee that glasses for side scuttles for ships purporting to comply with the requirements of this standard will pass the load stamp test and acceptance conditions described in 3.3.2.

In the event of a purchaser requiring tests to be made on any consignment of glasses, the sampling procedure described in 3.3.2.1 shall be adopted.

A suitable apparatus for carrying out the load stamp test is described in Appendix B.

3.3.2.1 Sampling of glasses. Each batch of glasses shall be tested separately. Where a batch consists of 4 glasses or less, each of the glasses shall be tested. Where a batch consists of more than 4 glasses, the test shall be carried out on a random sample of 4 glasses or on 2 % of the batch, whichever figure is the greater.

3.3.2.2 Proof loading. Each glass to be tested shall be subjected to the proof loading specified in Table 5, according to the nominal thickness of the glass.

Table 5 — Proof loading for load stamp test: punch method

Glass thickness		Proof loading		
Nominal	Limits of thickness	Diameter of orifice 120 mm	Diameter of orifice 150 mm	Diameter of orifice 200 mm
mm	mm	N	N	N
6	5.8 to 6.2	3 800	3 500	3 400
8	7.7 to 8.3	—	6 700	6 500
10	9.7 to 10.3	—	11 000	10 200
12	11.7 to 12.3	—	16 500	15 500
15	14.5 to 15.5	—	25 500	24 000
19	18.0 to 20.0	—	36 800	33 400

3.3.2.3 Procedure. The procedure is as follows.

- 1) Place the glass under test on the rubber-faced block so that no edge of the glass is less than 25 mm from the edge of the hole.
- 2) Lower the plunger on to the fibre pad placed on top of the glass and apply the appropriate load at a rate not greater than 1 000 N/s until the proof load is reached. As the proof load is approached the rate of loading may be reduced to avoid exceeding the proof load.
- 3) Maintain the specified load for a period of 5 s.