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Shipbuilding and marine structures — Ships' side scuttles

Construction navale et structures maritimes — Hublots de navires



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1751 was prepared by Technical Committee ISO/TC 8, *Shipbuilding and marine structures*, Sub-Committee SC 8, *Windows and side scuttles*.

This second edition cancels and replaces the first edition (ISO 1751:1977), of which it constitutes a technical revision.

Annex A forms an integral part of this International Standard.

Shipbuilding and marine structures — Ships' side scuttles

1 Scope

This International Standard specifies the classification of side scuttles for ships (series, types and models), and gives the dimensions for interchangeability and construction, materials, tests, marking and designation of these side scuttles.

NOTE 1 This International Standard is based on the experience on ships' window and glass manufacturers, shipbuilders and authorities who apply to ships the Regulations of the *International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974)*, with Amendments, 1981, and of the *International Convention on Load Lines, 1966*.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 261:1973, *ISO general purpose metric screw threads — General plan*.

ISO 614:1989, *Shipbuilding and marine structures — Toughened safety glass panes for rectangular windows and side scuttles — Punch method of non-destructive strength testing*.

ISO 1095:1989, *Shipbuilding and marine structures — Toughened safety glass panes for side scuttles*.

ISO 1207:1992, *Slotted cheese head screws — Product grade A*.

ISO 1580:1983, *Slotted pan head screws — Product grade A*.

ISO 2009:1983, *Slotted countersunk flat head screws (common head style) — Product grade A*.

ISO 2010:1983, *Slotted raised countersunk head screws (common head style) — Product grade A*.

ISO 3902:1990, *Shipbuilding and marine structures — Gaskets for rectangular windows and side scuttles*.

ISO 5780:1987, *Shipbuilding — Side scuttles — Positioning*.

ISO 5797-1:1989, *Shipbuilding and marine structures — Windows and side scuttles for fire-resistant constructions — Specifications — Part 1: "B" class divisions*.

ISO 6345:1990, *Shipbuilding and marine structures — Windows and side scuttles — Vocabulary*.

ISO 7045:1983, *Cross-recessed pan head screws — Product grade A*.

ISO 7046-2:1990, *Cross-recessed countersunk flat head screws (common head style) — Grade A — Part 2: Steel of property class 8.8, stainless steel and non-ferrous metals*.

ISO 7047:1983, *Cross-recessed raised countersunk head screws (common head style) — Product grade A*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6345 apply.

4 Classification

Side scuttles shall be classified by series, types, models and nominal sizes in accordance with 4.1 to 4.4 respectively.

NOTE 2 A survey of standardized side scuttles is given in 4.5 and table 3.

Further classification characteristics are the material classes (see 7.1 and table 12).

4.1 Series

4.1.1 Regular series (N)

Side scuttles of the regular series shall contain a toughened safety glass pane that meets the requirements of ISO 1095.

4.1.2 Fire-resistant series (P)

Side scuttles of the fire-resistant series shall be provided for installation in "A" or "B" class divisions. These side scuttles shall contain glass panes that meet the requirements of ISO 5797-1.

Modifications to the construction and installation of the glassholder and main frame, as well as additional testing and marking, shall be in accordance with ISO 5797-1.

4.2 Types

Ships' side scuttles may be of three types:

- Type A: Heavy-type side scuttle;
- Type B: Medium-type side scuttle;
- Type C: Light-type side scuttle.

4.3 Models

Models shall be designated according to the following principal characteristics:

- opening or non-opening model;
- with or without deadlight;
- opening direction of glassholder;
- type of fastening.

The various combinations of these, which are in accordance with the definitions in ISO 6345, are laid down in table 1.

4.4 Nominal sizes

The nominal size is defined by the clear light diameter d_l of the side scuttle: see table 2.

4.5 Survey of types, models and sizes

A survey is given in table 3 for all side scuttles standardized in this International Standard. It applies to series N (regular) and series P (fire-resistant) side scuttles.

The illustrations given in table 3 do not define the construction; they are simplified examples for information only.

5 Technical requirements

5.1 General

Side scuttles of all series, types, models and nominal sizes shall be manufactured to the requirements (dimensions, materials, etc.) given in this International Standard. They shall be capable of meeting the test requirements specified in clause 7.

In addition, for side scuttles for fire-resistant construction, the glassholder and the main frame shall be made of a material that keeps its mechanical characteristics at the temperatures given in ISO 5797-1.

They shall be designed so that temperature gradients do not develop stresses in the glass which could result in rupture.

5.2 Dimensions

5.2.1 Main dimensions

The main dimensions of side scuttles shall be as given in figure 1 and tables 4 and 5.

NOTE 3 Figure 1 does not define the construction of any series, type or model of side scuttle; it is given for the indication of standardized dimensions only. The illustration shows an opening side scuttle with deadlight.

1) "A" class divisions will form the subject of a future part 2, ISO 5797-2.

Table 1 — Principal characteristics of models

Opening or non-opening	Deadlight	Further attributes	Fastening		Model designation code		
			bolted (B)	welded (W)	A	Type B	C
opening	with	left hand ¹⁾ (L)	B	—	LB		—
			—	W	LW		—
		right hand ¹⁾ (R)	B	—	RB		—
			—	W	RW		—
		common hinged (S)	B	—	SB		—
			—	W	SW		—
	without	—	B	—	—		LRB
			—	W	—		LRW
non-opening	with	—	B	—	NB		—
			—	W	NW		—
	without		B	—	—	NB	
			—	W		NW	

1) The deadlight opening upwards. Opening side scuttles with deadlight opening downwards may be supplied by special agreement only.

Table 2 — Nominal sizes of side scuttles

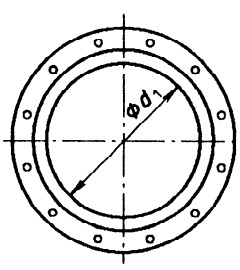
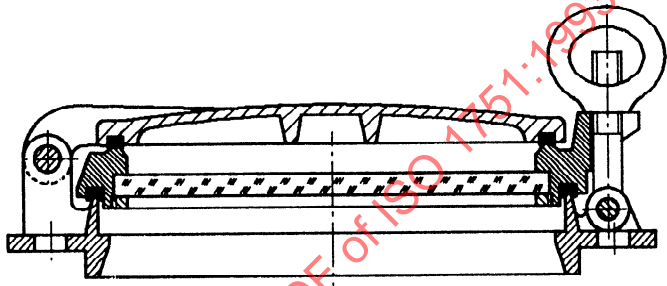
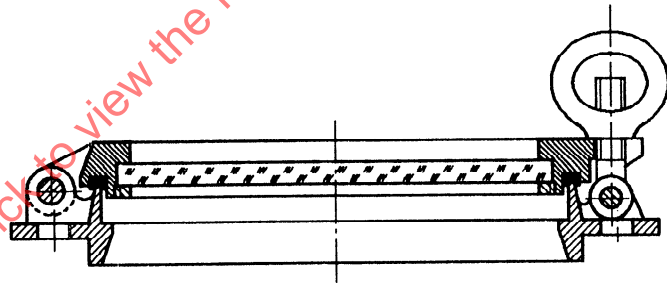
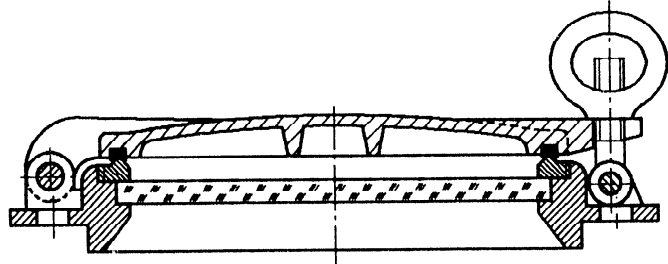
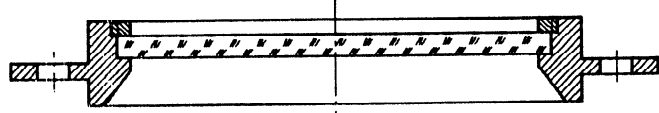
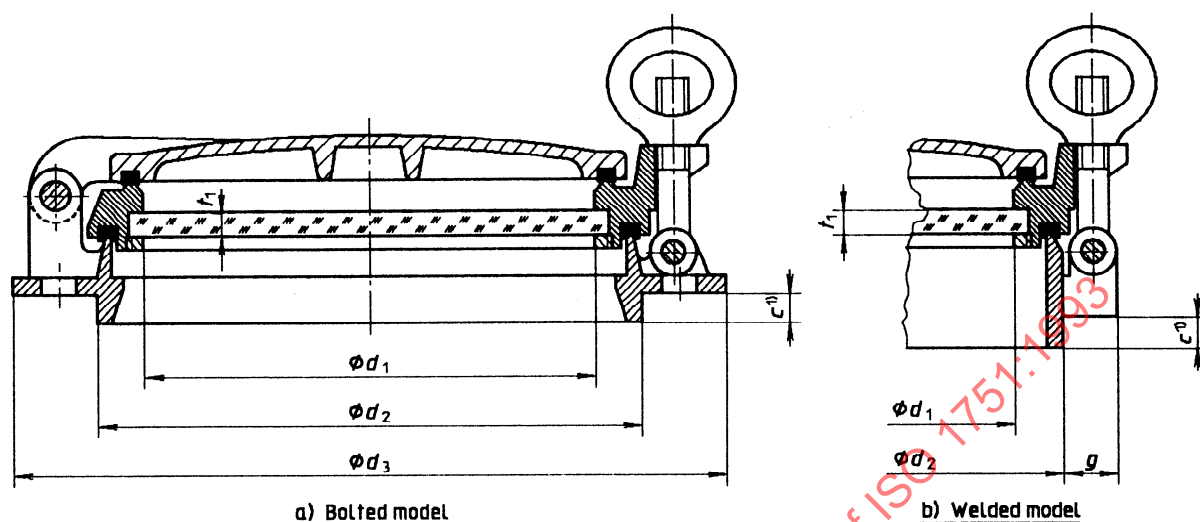
Type	Nominal size d_1 mm						Illustration
A	200	250	300	350	400	—	
B	200	250	300	350	400	450	
C	200	250	300	350	400	450	

Table 3 — Survey of side scuttles

Type (see 4.2)	Model (see 4.3)		Nominal sizes d_1 (see 4.4)	Illustration (bolted side scuttles are shown)
	bolted	welded		
Opening side scuttles				
A and B	LB	—	Type A: 200 to 400	with deadlight 
	—	LW		
	RB	—		
	—	RW		
	SB	—	Type B: 200 to 450	
	—	SW		
C	LRB	—	200 to 450	without deadlight 
	—	LRW		
Non-opening side scuttles				
A and B	NB	—	Type A: 200 to 400	with deadlight 
	—	NW	Type B: 200 to 450	
C	NB	—	200 to 450	without deadlight 
	—	NW		



1) For the spligot height (dimension c), see 5.2.2 and table 6.

Figure 1 — Main dimensions of side scuttle

Table 4 — Main dimensions and number of fasteners of side scuttles

Dimensions in millimetres

Nominal size, d_1			d_2	d_3	g	Minimum number of fasteners ¹⁾				
Type						Type A		Type B		Type C
A	B	C				± 2	max.	max.	glass-holder	dead-light
200	200	200	250	350	50	2	2	2	2	2
250	250	250	305	400	47,5	3	2	3	2	2
300	300	300	360	450	45	3	3	3	2	3
350	350	350	410	500	45	3	3	3	3	3
400	400	400	460	550	45	3	3	3	3	3
—	450	450	510	600	45	—	—	4	3	3

1) The number of fasteners comprises only closing devices and hinges with round holes: see 5.6.

5.2.2 Height of spigot

The recommended nominal heights of the main frame spigot, which should be preferred for all

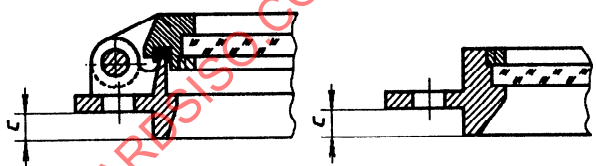
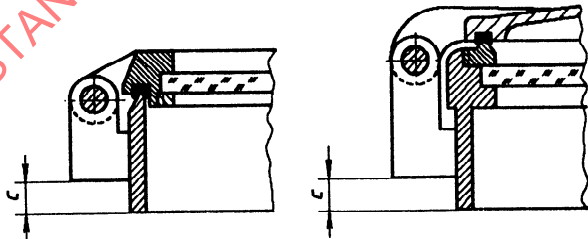
types, models and nominal sizes of side scuttles, are given in table 6.

Table 5 — Glass thickness of side scuttles

Dimensions in millimetres

Side scuttle		Glass thickness, t_1					
Series	Type	Nominal size, d_1 ¹⁾					
		200	250	300	350	400	450
N Regular	A	10	12	15	15	19	—
	B	8	8	10	12	12	15
	C	6	6	8	8	10	10
P Fire-resistant	A	see ISO 5797-1					
	B						
	C						
1) In special cases, a greater glass thickness shall be used for obscured glass panes: see 5.5.3 and table 9.							

Table 6 — Height of spigot (dimension c)

Model		Manufacturing height mm	Actual height mm
Bolted		16	The actual required delivery height of the spigot may be agreed when ordering the side scuttle
Welded		30	

5.2.3 Glass recess

The diameter of the glass recess, d_4 , in the glass-holder of opening side scuttles and in the main frame of non-opening side scuttles shall be as given in figure 5 and table 7.

5.3 Glass retaining frame

For fixing the glass pane, a glass retaining frame shall be provided.

Threaded glass retaining frames for screwing in or flanged glass retaining frames with holes for screwing on with screws are acceptable.

5.3.1 Threaded glass retaining frame (RFA)

The main dimensions of a threaded glass retaining frame are given in figure 2 and table 7.

A type RFA glass retaining frame shall not be used for non-opening, welded side scuttles (model NW).

5.3.2 Flanged glass retaining frame (RFB and RFC)

The main dimensions of a flanged glass retaining frame are given in figures 3 and 4, and table 7.

A type RFB glass retaining frame may be used for all types and models of side scuttles.

Type RFC may only be used for side scuttles without deadlight.

5.3.3 Screws for flanged glass retaining frames

To fasten glass retaining frames of types RFB and RFC, slotted or cross recessed screws in accordance with ISO 1207, ISO 1580, ISO 2009, ISO 2010, ISO 7045, ISO 7046-2 or ISO 7047 should be used, at the window manufacturer's discretion. Such screws shall have the following characteristics:

- thread: M6
- length: 16 mm
- material: Marine corrosion-resistant copper alloy (for side scuttles of copper alloy); stainless steel (for side scuttles of steel or aluminium alloy).

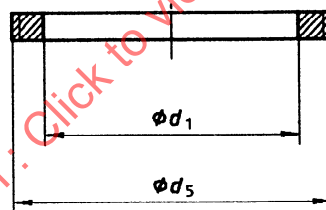


Figure 2 — Glass retaining frame, type RFA

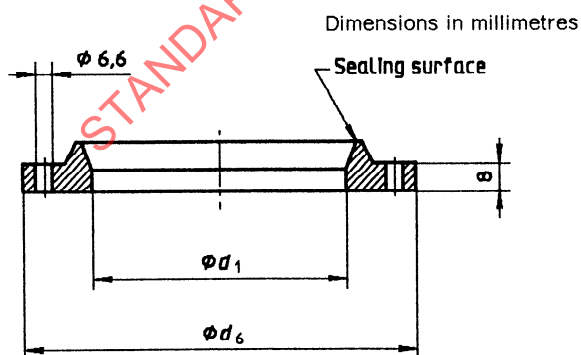


Figure 3 — Flanged glass retaining frame, type RFB

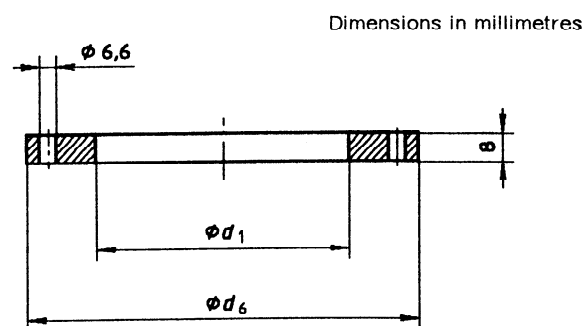
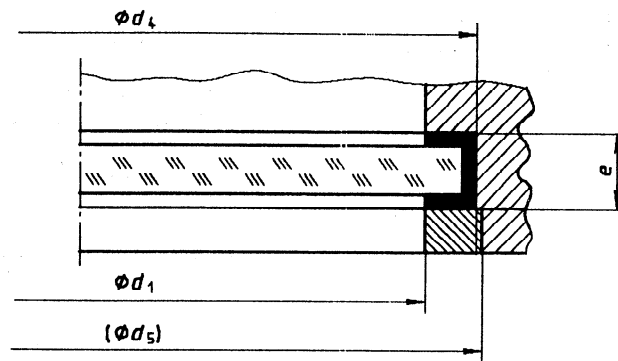
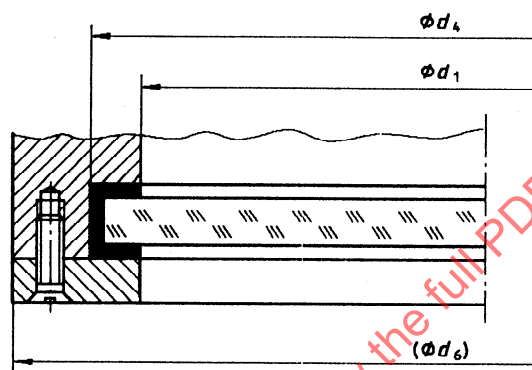


Figure 4 — Flanged glass retaining frame, type RFC



a) Threaded glass retaining frame



b) Flanged glass retaining frame

Figure 5 — Fixing of glass pane and glass recess

Table 7 — Mounting dimensions for glass pane

Dimensions in millimetres

Dimensions in millimetres						
Nominal size d_1	200	250	300	350	400	450
d_4 min.	217	267	322	372	422	472
d_5	M220 × 2	M270 × 2	M325 × 2	M375 × 2	M425 × 2	M475 × 2
d_6 min.	248	298	348	398	448	498
Number of screw holes ¹⁾	10	12	14	16	18	20
e	This dimension is left to the manufacturer's option. It depends on the thickness of the glass pane and glazing sealing material.					
1) Uniform pitch.						

5.4 Glass panes

5.4.1 Panes for regular side scuttles (series N)

Clear or obscured toughened safety glass panes in accordance with ISO 1095 shall be used: appropriate codes are given in table 8. Correlation of glass thickness with types and nominal sizes shall be as given in table 5, with the peculiarity for obscured glass panes given in 5.5.3.

Table 8 — Finish of glass pane

Kind of finish	Code
clear	Y1
obscured	Y2

5.4.2 Panes for side scuttles for fire-resistant constructions (series P)

Glass panes in accordance with ISO 5797-1 shall be used. Depending on the application conditions, the shipbuilder shall decide for which fire-resistance class the side scuttle is suitable (see footnote, page 2).

Glass panes are standardized for side scuttles for fire-resistance classes B-0 and B-15: see ISO 5797-1.

5.5 Glazing

5.5.1 Glazing material

An appropriate glazing material, resistant to sea water and ultraviolet light, shall be used.

5.5.2 Mounting of glass pane

When glazing, it is essential that the glass pane is centralized in the glassholder of opening side scuttles or in the main frame of non-opening side scuttles so that there is the same clearance all round.

The necessity of using additional packing for the mounting of special glass panes for side scuttles for fire-resistant constructions (series P) depends on the construction of the glassholder, and on the composition and edge protection (if any) of these glass panes.

5.5.3 Peculiarity for obscured glass panes

Mounting position A

In general, obscured glass panes are positioned with the obscured surface outwards. For this positioning, the glass thicknesses given in table 5 apply. It shall be noted, however, that the glass pane becomes transparent when wet.

Mounting position B

When, in special cases, an obscured toughened safety glass pane is positioned with the obscured surface facing inwards, a greater glass thickness than that specified in table 5 shall be used. These greater thicknesses shall be as given in table 9.

Table 9 — Thickness of obscured glass panes when obscured surface is facing inwards

Dimensions in millimetres

Nominal size d_1	Glass thickness for type of side scuttle:		
	A	B	C
200	15	12	10
250	19	12	10
300	—	15	12
350	—	19	12
400	—	19	15
450	—	—	15

5.6 Fasteners (closing devices and hinges)

5.6.1 Number of fasteners

- The minimum number of fasteners comprising closing devices and hinges with round holes for glassholders and deadlights of type A, B, and C side scuttles shall be as given in table 4.
- The total number of the fasteners and their construction shall be such that the side scuttle meets the strength and watertightness requirements in clause 7.

NOTE 4 If the hole for the hinge of the glassholder and deadlight is oval, the hinge is not regarded as a fastener.

5.6.2 Closing device

The swingbolt, swingbolt nut and swingbolt hinge pin are component parts of a closing device. Their main dimensions shall be as given in table 10.

5.6.3 Hinges

The diameter of hinge pins shall be as given in table 10.

Table 10 — Diameter of bolts and pins

Dimensions in millimetres

Thread of swingbolt and nut (in accordance with ISO 261)	Diameter of hinge pin for	
	swingbolt	glassholder and deadlight
M20	12	16

5.7 Gaskets for glassholder and deadlight

To ensure watertightness between the glassholder and main frame and also between the deadlight and glassholder, gaskets shall be used.

5.7.1 Type of gasket

The gaskets shall be of type A or B in accordance with ISO 3902, at the manufacturer's discretion.

5.7.2 Fixing of gaskets

The gaskets shall be secured in the grooves of the glassholder and deadlight by means of a suitable adhesive.

6 Materials

6.1 Main frame, glassholder, glass-retaining frame and deadlight

The main components of the side scuttle (main frame, glassholder, glass-retaining frame and deadlight) shall be manufactured from the materials given in table 12. These materials shall be marine corrosion-resistant and shall have the minimum mechanical properties given in table 13. The values for the minimum tensile strength and minimum elongation given in table 13 are valid for the types of side scuttle indicated. However, the material used should comply with any relevant national standard.

The material class code numbers given in table 12, which are for indicating the material in the side scuttle designation, are combinations of the material code numbers, given in table 11, for the main frame, the glassholder and/or glass retaining frame and the deadlight, in that order.

Table 11 — Material code numbers

Material code number	Material
1	Copper material (for example brass, gun metal)
2	Ferrous material (for example mild steel, cast steel, iron)
3	Aluminium material (cast or wrought alloy)
0	No components (for example deadlights for type C side scuttles)

Table 12 — Material classes

Type of side scuttle	Method of fastening side scuttle	Material class code number	Material		
			Main frame	Glassholder and/or glass retaining frame	Deadlight
A	bolted	112	copper alloy ¹⁾		iron or steel ²⁾
	welded	212	mild steel	copper alloy ¹⁾	iron or steel ²⁾
		222	mild steel		
B	bolted	112	copper alloy ¹⁾		iron or steel ²⁾
		333	aluminium alloy ³⁾		
	welded	212	mild steel	copper alloy ¹⁾	iron or steel ²⁾
		222	mild steel		
		333	aluminium alloy		
			4)	3)	3)
C	bolted	110	copper alloy ¹⁾		—
		330	aluminium alloy ³⁾		
	welded	210	mild steel	copper alloy ¹⁾	
		220	mild steel		
		330	aluminium alloy		
			4)	3)	

1) The use of brass (cast or wrought) or gun metal is optional.

2) The use of iron (spheroidal graphite cast iron) or steel (mild steel or cast steel) is optional.

3) The use of cast or wrought alloy is optional.

4) The use of plate or extruded material is optional.

Table 13 — Tensile strength and elongation for main components

Type of side scuttle	Minimum tensile strength N/mm ²	Minimum elongation %
A	300	15
B	180	10
C	140	3

6.2 Closing device and hinge pin

Swingbolts, pins and nuts of the closing device and hinge pins for the glassholder and deadlight shall be manufactured from materials having the following properties:

- a) resistant to corrosion;
- b) no effect on the corrosion resistance of other parts;
- c) minimum mechanical properties as given in table 14.

The values for the minimum tensile strength and minimum elongation given in table 14 are valid for the types of side scuttle indicated. However, the material used should comply with any relevant national standard.

For aluminium alloy side scuttles, the swingbolts and hinge pin of the glassholder shall be made of non-corrodible steel, stainless steel or such alloys as are not likely to cause corrosion of side scuttles, bolts or pins.

7 Testing

7.1 Watertightness test

Maximum allowable pressures for side scuttles are given in annex A.

7.1.1 Board test

To ensure that the side scuttle and packing are watertight when fitted, a hose test shall be carried out by the shipbuilder to the satisfaction of the owner's or surveyor's representative.

The test shall consist of hosing the side scuttle by means of at least 12,5 mm nominal size hose held at a distance of not more than 1,5 m from the side scuttle and with a water pressure of at least 250 kPa.

7.1.2 Shop test

An equivalent hydraulic test shall be carried out by the manufacturer before despatch by means of batch tests (approximately 10 % of the delivery batch, with a minimum of two side scuttles).

The side scuttle shall be tested by being subjected to the hydraulic pressures given in table 15, under the following conditions:

Procedure 1: with glass pane and open deadlight except for type A, with diameters of 350 mm and 400 mm, where at a test pressure of 150 kPa the deadlight shall be closed.

Procedure 2: without glass pane and with closed deadlight.

Table 14 — Tensile strength and elongation for closing devices

Type of side scuttle	Hinge pin swingbolt and swingbolt pin		Nut	
	Minimum tensile strength	Minimum elongation	Minimum tensile strength	Minimum elongation
	N/mm ²	%	N/mm ²	%
A	350	20	250	14
B	350	15	250	14
C	250	14	180	8