INTERNATIONAL STANDARD 614

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

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FOREWORD

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Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 614 (originally Draft No. 2413) was drawn up by Technical Committee ISO/TC 8, *Shipbuilding*.

It was approved in January 1972 by the Member Bodies of the following countries :

Austria	India	Spain
Belgium	Israel	Sweden
Czechoslovakia	Italy	Thailand
Egypt, Arab Rep. of	Japan	Turkey
Finland	Netherlands	United Kingdom
France	Poland	
Germany	Romania	

No Member Body expressed disapproval of the document.

This International Standard cancels and replaces ISO Recommendation R 614-1967.

Printed in Switzerland

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

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for the non-destructive strength testing of clear and obscured toughened safety glasses for ships' side scuttles and rectangular windows.

2 REFERENCES

For glasses, see :

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

ISO . . ., *Shipbuilding — Toughened safety glasses for rectangular windows in ships.* [1)]

For ships' side scuttles, see :

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

3 MANUFACTURE

Toughened safety glass, plate glass (float or polished) or sheet glass, is produced by subjecting glass to a process of heating and rapid cooling so as to induce high compressive stresses in the surface zones balanced by high tension in the central plane. This treatment endows the glass with greatly increased resistance to external forces such as mechanical loading and thermal shock.

NOTES

1 The process of obscuring transparent glass has to be effected before the procedure of toughening.

2 If toughened safety glass is fractured it gives fragments which are less liable to cause severe cuts than fragments of ordinary glass.

4 TEST APPARATUS

The apparatus to be used for the testing of glass panes is illustrated in Figures 1, 2 and 3.

There are two forms of test apparatus, A and B.

Form A (Figure 1) applies to testing glasses of side scuttles of nominal size 250 mm and above and glasses of rectangular windows of all sizes.

Form B (Figure 2) applies to testing glasses of side scuttles of nominal size 150 mm and 200 mm.

Figure 3 gives the dimensions of the punch to be used in the tests.

5 PROCEDURE

5.1 Place the glass pane to be tested on top of the flat ring (component No. 2) so that no edge of the glass is less than 25 mm from the edge of the hole in the ring. Position the punch (component No. 3) centrally over the flat ring.

Interpose a pad (component No. 4) between the glass pane being tested and the punch (see Figures 1 and 2).

5.2 When testing obscured glass panes the load shall be applied to the obscured surface.

5.3 Apply the testing load to the punch, increasing steadily at the rate of 1 000 N per second until the specified proof load is reached (see section 6). Maintain this load for 5 s.

5.4 Gradually remove the load from the pane.

6 PROOF LOAD

The values given in Table 2 apply to clear toughened glass panes having the thicknesses indicated, and to obscured toughened glass panes with a minimum thickness of 6 mm.

1) In preparation.

Dimensions in millimetres

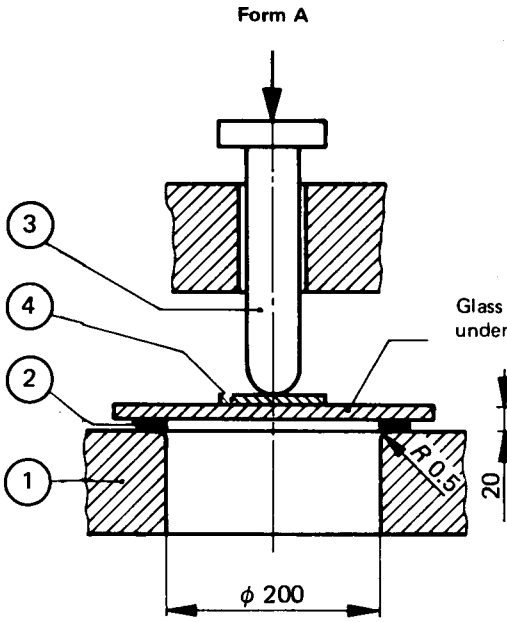

FIGURE 1

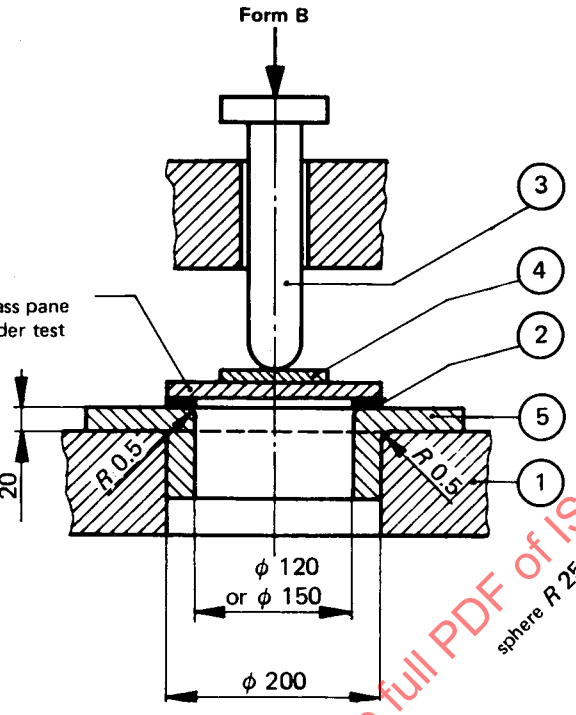

FIGURE 2

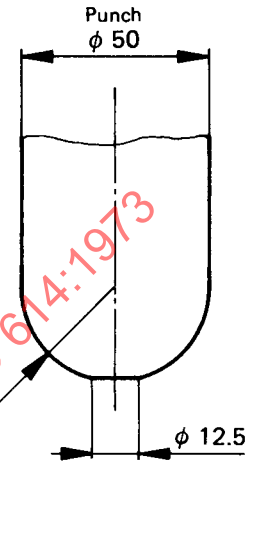

FIGURE 3

TABLE 1

Component number		Component	Material	Specification	
form					
A	B				
1		base plate	steel	The plate shall be of sufficient thickness to prevent deformation under pressure. Surface : flat	
2		flat ring	rubber, hardness 40 to 60 IRHD[1)]	For form A : internal diameter 200 mm, For form B : Internal diameter 120 mm or 150 mm, being flush with the adaptor (component No. 5)	thickness : 2 mm width : 15 mm minimum
3		punch	steel	Lower part flattened so that a diameter of 12,5 mm is obtained	
4		pad	felt or fibre-board	Thickness : ≈ 5 mm for felt or ≈ 2 mm for fibre-board External diameter : ≈ 50 mm	
–	5	adaptor	steel	External diameter : being flush with the hole in the base plate. Internal diameter : 120 mm for glass panes of side scuttles of nominal size 150; 150 mm for glass panes of side scuttles of nominal size 200.	

1) IRHD = International Rubber Hardness Degrees; see ISO/R 48, *Determination of hardness of vulcanized rubbers.*

TABLE 2

Glass pane			Proof load for diameter of hole of test apparatus		
thickness	tolerance		form A	form B	
	plate glass	sheet glass	200 mm	150 mm	120 mm
mm	mm	mm	N [1]	N [1]	N [1]
4	± 0,2	± 0,2	–	–	1 800
6		± 0,3	3 400	3 500	3 800
8	± 0,3	± 0,5	6 500	6 700	–
10		± 0,6	10 200	11 000	–
12		± 0,7	15 500	–	–
15	± 0,5	± 1	24 000	–	–
19	± 1	± 1	33 400	–	–

1) $1N = \frac{1}{9{,}806\,65}$ kgf (exactly)

7 MARKING

7.1 Clear toughened safety glass panes, tested according to this International Standard, shall be marked by an equilateral triangle, as indicated in Figure 4.

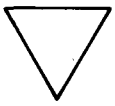

FIGURE 4

7.2 Obscured and other non-transparent toughened safety glass panes, tested according to this International Standard, shall be marked by a double equilateral triangle, as indicated in Figure 5, after the obscuring process and before toughening.

FIGURE 5

7.3 The nominal thickness of the toughened safety glass pane may be inserted within the triangle(s).

To differentiate between plate glass and sheet glass, the numerals indicating the thickness in the case of sheet glass are to be inscribed within a circle.

Figure 6 shows the minimum values of the dimensions to be used for the numerals, the circles and the triangles.

Dimensions in millimetres (minimum values)

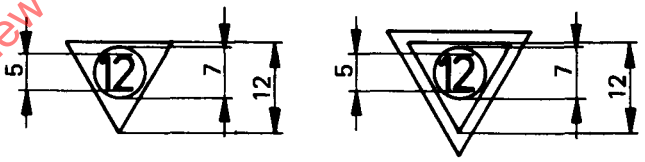

FIGURE 6

7.4 Examples

for sheet glass :

FIGURE 7

for plate glass :

FIGURE 8

8 SAMPLING OF GLASSES

Sampling of glasses to be tested by the method described in this International Standard will be the subject of another International Standard.