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"पुराने को छोड नये के तरफ"
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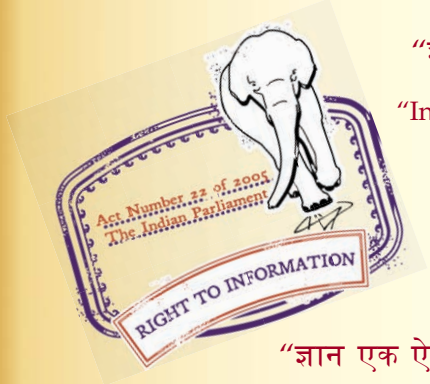
IS 5437 (1994): Figured rolled and wired glass [CHD 10: Glassware]



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"Knowledge is such a treasure which cannot be stolen"

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IS 5437 : 1994

भारतीय मानक

उत्कीर्ण-चित्रित, बेल्लित तथा तार युक्त काँच — विशिष्टि

(पहला पुनरीक्षण)

Indian Standard

FIGURED, ROLLED AND WIRED GLASS — SPECIFICATION

(First Revision)

UDC 666.166

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1994 **Price Group 3**

Glassware Sectional Committee, CHD 010

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Glassware Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1969. The concerned committee felt the need to revise this standard in view of the technological development and experience gained in this field.

In this revision, the minimum distance between stones has been specified and, no gaseous bubble has been allowed. The method for measurement of thickness, warpage and the method for measurement have been specified. Tolerance of thickness has been modified and dimensional tolerance has been specified.

This standard contains clauses **4.1, 5.1, 6.1** and **7.1** which provide for agreement between the purchaser and the supplier.

The composition of the technical committee responsible for formulating this standard is given in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 2 JANUARY 2006
TO
IS 5437 : 1994 FIGURED, ROLLED AND WIRED GLASS — SPECIFICATION

(First Revision)

(*Page* 1, *clause* **2**) — Substitute the following for the existing clause

'**2 REFERENCES**

The standards listed below contain provisions which through reference in this text, constitute provisions of this standard At the time of publication, the editions indicated were valid All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below

IS No		*Title*
1382	1981	Glossary of terms relating to glass and glassware (*first revision*)
2835	1987	Specification for flat transparent sheet glass (*third revision*)'

(CHD 10)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 MAY 2002
TO
IS 5437 : 1994 FIGURED, ROLLED AND WIRED GLASS — SPECIFICATION

(*First Revision*)

(*Page* 1, *Table* 1) — Substitute the following for the existing table

Table 1 Thickness and Dimensional Tolerances of Figured, Rolled and Wired Glass

SI No.	Nominal Thickness, mm	Thickness Tolerance, mm	Dimensional Tolerance, mm
(1)	(2)	(3)	(4)
i)	2 0	±0 2	±1 5
ii)	3 0	±0 2	±2 0
iii)	4 0	±0 2	±2.0
iv)	5 0	±0 3	±2 0
v)	6 0	±0 3	±2 0

(*Page* 1, *clause* **6.1**) — Substitute '6.0 ± 0.4 mm' *for* '6.0 ±0 5 mm'.

(CHD 10)

Reprography Unit, BIS, New Delhi, India

Indian Standard

FIGURED, ROLLED AND WIRED GLASS — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements and methods of sampling and test for figured, rolled and wired glass.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	*Title*
1382 : 1981	Glossary of terms related to glass industry
2835 : 1987	Flat transparent sheet glass

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definitions and those given in IS 13S2 : 1981 shall apply.

3.1.1 *Rolled Glass*

Flat glass, formed by rolling, including figured, wired and plain rolled glass.

3.1.2 *Mistint Glass*

Glass containing non-homogenous colour patches, colours streaks, colour intensity varying within the sheet.

4 GENERAL REQUIREMENTS FOR FIGURED, ROLLED AND WIRED GLASS

4.1 Glass may be clear or tinted as agreed to between the supplier and the purchaser.

4.2 The glass shall not contain any stones with cracks.

4.2.1 The glass shall not contain any stones bigger than 2 mm diameter or which protrude from either side of the glass. The size of the stones may be determined by using a travelling microscope or any other suitable device.

4.2.2 Stones shall be separated by at least 60 cms.

4.2.3 The glass sheet shall have not more than one gaseous inclusion greater than 3.5 mm or equivalent elliptical inclusion up to 20 mm long in 1 m^2 of each cut sheet.

4.2.4 *Thickness Measurement*

Measure to the nearest 0.01 mm with the caliper micrometer the thickness of the glass at the centre of each of the four edges of the pane. Each of the four reading shall be within the tolerance limit of the nominal thickness.

NOTE — For figured and figured wired glass, thickness shall be measured at the crest of the design.

4.2.5 *Warpage*

Warpage shall not be more than 1 percent when tested according to **4.2.5.1.**

4.2.5.1 *Warpage measurement*

Warpage shall be measured with the specimen standing vertically on a wooden plank. Stretch a thread edge to edge of the sample. Measure the longest perpendicular distance from the thread to the surface of the sample facing the thread and express it as percentage of the length of sample from edge to edge along the thread.

5 THICKNESS AND DIMENSIONAL TOLERANCE OF FIGURED AND ROLLED GLASS

5.1 Thickness and dimensional tolerances of figured and rolled glass shall be in accordance with Table 1. Any other thickness as agreed to between purchaser and supplier may be provided.

Table 1 Thickness and Dimensional Tolerances of Figured, Rolled and Wired Glass

Sl No.	Nominal Thickness (mm)	Thickness Tolerance (mm)	Dimensional Tolerance (mm)
(1)	(2)	(3)	(4)
1	2 0	± 0.2	± 2 0
2	3 0	+ 0 4	± 3 0
3	4.0	–0.3	± 3 0
4	5 0	± 0 4	± 3 0
5	6 0	± 0 5	± 3 0

6 REQUIREMENTS SPECIFIC TO WIRED GLASS

6.1 Thickness

Thickness of wired glass shall be 6 0 ± 0 5 mm.

NOTE — The thickness can also be as agreed to between the purchaser and the supplier and the maximum tolerance on thickness shall be 9 percent of the nominal thickness.

6.2 Dimensional Tolerance

Tolerance on cut size of wired glass shall be ±3.0 mm.

6.3 Wire Mesh

The wire mesh used in the wired glass or wired figured glass shall be made of steel wire 0.46 to 0.56 mm in diameter. The pattern of mesh shall be square or diamond with wires welded or hexagonal with wires twisted. In the case of welded mesh, the wire running across the manufacturing width shall be measured.

6.4 Position of Wire Mesh

The wire mesh shall be embedded completely in the glass sheet at least 1 mm from the surface and shall not be exposed at any place.

6.5 Broken Wires

Wire mesh shall not contain more than 3 broken wires per square metre of the wired glass or wired figured glass.

6.6 Flameproofness

Wired glass and wired figured glass shall satisfy the flameproofness test prescribed in Annex A.

7 PACKING AND MARKING

7.1 Packing

The glass shall be supplied as agreed to between the purchaser and the supplier.

7.2 Marking

Each package shall be marked legibly with the following information:

a) Name and thickness of the material;

b) Indication of source of manufacture, and

c) Lot number to enable the batch of manufacture to be traced out from records

7 2.1 *BIS Certification Marking*

The product may also be marked with Standard Mark.

7.2.1.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 SAMPLING

8.1 Representative samples of the material shall be drawn as prescribed in Annex B.

ANNEX A

(*Clause* 6.6)

TEST FOR FLAMEPROOFNESS

A-0 GENERAL

A-0.1 Wired glass or wired-figured glass is glazed or a removable wall of a gas fired furnace, healed to a temperature of 850° ± 10°C and sprayed with water

A-1 APPARATUS

A-1.1 Furnace

Gas fired, having a removable wall provided with a window for glazing the sample of glass pane 40 × 40 cm in size.

A-1.2 Rubber Hose

Provided with a spray nozzle 12.7 mm in diameter and capable of spraying water at a pressure of 1 kgf/cm^2.

A-2 PROCEDURE

A-2.1 Mount the wired glass sample 40 × 40 cm in size on the window of the removable wall of the gas fired furnace so that it is flush with the inner surface of the wall. Raise the temperature of the furnace following the schedule given below, the temperature being measured by means of a thermocouple whose hot junction is located at a distance of 15 cm from the wired glass pane, the exposed length of the thermocouple protection tube in the furnace chamber being not less than 30 cm:

After	5 minutes	500° ± 25°C
	,, 10 ,,	700° ± 20°C
	,, 20 ,,	800° ± 15°C
	,, 30 ,,	850° ± 10°C

A-2.2 Immediately upon attaining the temperature of 850° ± 10°C, remove the furnace wall in which the wired glass pane is glazed and subject the flame exposed face of the glass pane to a jet of water for 15 seconds, the interval between attainment of temperature and impingement of water being 30 ± 5 seconds. Direct the jet of water to the centre of the test surface at an angle of 30° (to the horizontal plane) and at a pressure of 1 kgf/cm^2, the nozzle being located at a distance (angular) of 5 metres from the glass pane.

A-2.3 The wired glass shall satisfy the requirement of the test if it remains in sash intact and no clearances or passages, through which flame may easily pass, are formed. Any cracking due to thermal shock shall be disregarded.

ANNEX B

(*Clause* 8.1)

SAMPLING OF WIRED AND FIGURED GLASS

B-1 SCALE OF SAMPLING

B-1.1 Lot

All the sheets of glass in a consignment belonging to the same type, grade and size, and produced in the same batch of manufacture shall constitute a lot.

NOTE — Glass sheets of the same length, width and thickness shall be regarded to be of the same size

B-1.2 Samples shall be tested separately from each lot for ascertaining conformity of the material in the lot to the requirements of this specification.

B-1.3 The number of samples to be selected for testing shall depend on lot size and shall be in accordance with col 1 and 2 of Table 2. These samples shall be withdrawn at random from the lot

B-1.4 In order to ensure randomness of selection of the samples from the lot, random number tables shall be used. However, in case such a table is not available, the following procedure may be adopted.

Starting from any sheet in the lot, count them as 1,2,3, ... etc, up to *r* and so on, in any order: *r* wiil be the integral part of *N/n* where *N* is the number of sheets in the lot and *n* the number of sheets to be selected in the sample. Every *r*th sheet, thus counted, shall be withdrawn from the lot to constitute the sample.

B-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

B-2.1 Flameproofness

The number of sheets to be tested for flameproofness shall be according to col 3 of Table 2. and shall be taken from those selected in **B-1.3**. If all the sheets tested for flameproofness pass the test, the lot shall be subjected to further testing for other requirements, otherwise the lot shall be rejected without further test

B-2.2 Other Requirements

Testing for all requirements other than flameproofness shall be performed in two stages. Any sheet not satisfying any ofthese requirements shall be considered as a defective.

B-2.3 First Stage

In the first stage of testing, half the number of sheets remaining in the sample after the flameproofness test (*see* col 4 and 5 of Table 2) shall be taken. They shall be examined for the requirements of this specification.

B-2.3.1 If the number of defectives is less than or equal to the corresponding acceptance number shown in col 7 of Table 2 against the first stage, the lot shall be accepted without testing the remaining sample sheets in the second stage.

B-2.3.2 If the number of defectives is greater than or equal to the corresponding rejection number shown in col 8 of Table 2 against the

Table 2 Number of Samples and Tests

(*Clause* B-1 3)

Lot Size	Sample Size	Samples for Flameproofness	Samples for All Other Requirements				
			Stage	Stage Sample	Cumulative Sample	Acceptance Number	Rejection Number
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Up to 100	12	2	First	5	5	0	2
			Second	5	10	1	2
101 to 300	19	3	First	8	8	0	3
			Second	8	16	3	4
301 to 500	30	4	First	13	13	1	4
			Second	13	26	4	5
501 to 1 000	45	5	First	20	20	2	5
			Second	20	40	6	7
1 001 and Above	70	6	First	32	32	3	7
			Second	32	64	8	9

first stage, the lot shall be rejected without testing the remaining sample sheets in the second stage.

B-2.3.3 If the number of defectives lies between the acceptance number and the rejection number for the first stage, the testing will proceed to the second stage.

B-2.4 Second Stage

In the second stage, the remaining sample sheets (*see* col 4 and 5 of Table 2) shall be tested for the requirements as in the first stage. The number of defectives found in the second stage will be added to those found in the first stage. If the total number of defectives is less than or equal to the corresponding acceptance number shown in col 7 of Table 2 against the second stage, the lot shall be declared as conforming to the requirements of this specification. If the total number of defectives is equal to or greater than the corresponding rejection number shown in col 8 of Table 2 against the second stage, the lot shall be rejected.

ANNEX C
(*Foreword*)

COMMITTEE COMPOSITION

Glassware Sectional Committee, CHD 010

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SHRIMATI D. G. DASTIDER
Assistant Director (Chem), BIS

(. *Continued on Page* 6)

(*Continued from Page* 5)

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Amendments Issued Since Publication

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