भारतीय मानक
Indian Standard

IS 14900 : 2018

पारदर्शी प्लव काँच — विशिष्टि

(पहला पुनरीक्षण)

Transparent Float Glass — Specification

(First Revision)

ICS 81.040.20

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Glass, Glassware and Laboratoryware Sectional Committee, CHD 10

FOREWORD

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

Float glass is manufactured by allowing the glass from the tank furnace to flow across a bath of molten tin, in a controlled atmosphere of nitrogen and hydrogen which yields transparent glass sheet, the surfaces of which are flat and parallel so that they provide clear, undistorted vision and reflection. The primary use of float glass is for architectural applications, mirrors and automotives.

Float glass has replaced the sheet and plate glass over the time period, being made from fuel efficient process and giving high optical clarity with uniform thickness.

This standard was first published in 2000. While formulating this standard, due weightage was given to the standards and practices prevailing in different countries including India.

In this revision, scope has been modified to incorporate jumbo size. Terminology has been expanded. Considering the development in manufacturing technology, requirements for dimensional tolerances, squareness, acceptable imperfections (spot faults, linear faults, optical faults) has been modified. Visual light transmission has been added as new requirement. The tolerance for nominal thickness has been made more stringent. UV test to identify tin side of float glass has been incorporated.

In the formulation of this standard, considerable assistance has been derived from the following publications:

ASTM C 1036-16	Standard specification for flat glass
CAN/CGSB 12.3-M91	Flat, clear float glass
EN 572-2 : 2012	Glass in building — Basic soda lime silicate glass products — Part 2: Float glass
ISO 3538 : 1997	Road vehicles — Safety glazing materials — Test methods for optical properties
ISO 16293-2 : 2016	Glass in building — Basic soda lime silicate glass products — Part 2: Float glass
JIS R3202-2011	Float glass and polished plate glass

The composition of the technical committee responsible for formulation of this standard is given in Annex H.

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.

Indian Standard

TRANSPARENT FLOAT GLASS — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard prescribes the requirements, method of sampling and tests for flat, transparent, clear float glass having glossy, plain and smooth surfaces.

1.2 This standard covers jumbo, cut sizes or stock sheets square, rectangular and of other shapes.

1.3 This standard does not cover tinted, coated, frosted and heat absorbing glasses.

2 REFERENCES

The standards given 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*
IS 1382 : 1981	Glossary of terms relating to glass and glassware (*first revision*)
IS 4905 : 2015	Random sampling and randomization procedures (*first revision*)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1382 shall apply, in addition to the following.

3.1 Bloom

Bloom is bluish discoloration on the glass bottom surface due to high level of dissolved stannous oxide in the ribbon's bottom surface. It appears when the glass is heated to a temperature above 630°C.

3.2 Bubbles

Gaseous inclusions (*see* **3.6**) in glass. These inclusions are normally brilliant in appearance.

3.3 Cords

Heavy strings incorporated in the sheet rather than on the surface, occurring without any regularity of direction and of considerable thickness [*see also* Ream (**3.12**)].

3.4 Crush

A lightly pitted area resulting in a dull grey appearance over the region.

3.5 Digs

Deep, short scratches.

3.6 Gaseous Inclusions

Round or elongated bubbles in the glass.

3.7 Jumbo Sizes

Glass delivered with sizes as following:

a) Nominal length ≥ 4 000 mm; and
b) Nominal width ≥ 3 000 mm.

3.8 Knots

A transparent area of incompletely assimilated glass having an irregular, knotty or tangled appearance.

3.9 Linear/Extended Faults

Faults which can be on or in the glass, in the form of deposits, marks or scratches that occupy an extended length or area.

3.10 Open Gaseous Inclusions

Bubbles at the surface of glass that are open, leaving a cavity in the finished surface.

3.11 Optical Faults

Faults, which leads to distortion in the appearance of objects observed through glass.

3.12 Ream

Inclusions within the glass, or layers or strings of glass, that are not homogeneous with the main body of the glass.

3.13 Rubs

Abrasion of the glass surfaces producing a frosted appearance. A rub differs from a scratch in having appreciable width.

3.14 Scratches

Any marking or tearing of the surface appearing as though it had been done by either a sharp or rough instrument.

3.15 Seeds (Fine and Coarse)

Bubbles of diameter less than 0.6 mm. The seeds are visible only upon close inspection, usually appearing as small specks, and are an inherent imperfection in glass.

3.16 Spot Fault

It is a nucleus, which is generally accompanied by halo of distorted glass. The dimension of the spot fault comprising of nucleus with a halo is obtained by multiplying the dimension of the nucleus by factor of approximately 3. Spot faults can be solid inclusions, bubbles, rubs, crush etc.

3.17 Stones

Any opaque or partially melted particle of rock, clay or batch ingredient embedded in the glass.

3.18 Strings

Wavy, transparent lines appearing as though a thread of glass had been incorporated into the sheet.

3.19 Visual Faults

Faults which alter visual quality of glass. They consist of spot and linear/extended faults.

3.20 Wave

Defects resulting from irregularities of the surface of glass making the object appear wavy or bent when viewed at varying angles.

4 REQUIREMENTS

4.1 Characteristic

A glass shall be deemed to be manufactured using float glass technology if the tin side of the glass can be identified by the UV light test as prescribed in Annex A.

4.2 Visual Light Transmission

The minimum value for visual light transmission for a flat, transparent clear float glass, when measured as per Annex B, shall be as prescribed in Table 1.

4.3 Dimensions and Tolerances

4.3.1 *Thickness*

Float glass thickness shall be measured with micrometer or calipers, which is graduated to 0.01 mm or with a measuring instrument having an equivalent accuracy. The tolerances on thickness shall be as specified in Table 2.

Table 1 Minimum Visual Light Transmission Value Designating a Transparent Glass as Clear Glass

(*Clause* 4.2)

Sl No.	Nominal Thickness (mm)	Minimum value of visual light transmission (percent)
(1)	(2)	(3)
i)	< 2	89
ii)	2	89
iii)	2.5	88
iv)	3	88
v)	3.2	87
vi)	3.5	87
vii)	4	87
viii)	5	86
ix)	5.5	85
x)	6	85
xi)	8	83
xii)	10	81
xiii)	12	79
xiv)	15	76
xv)	19	72
xvi)	25	67

Table 2 Nominal Thickness and Tolerance of Float Glass

(*Clause* 4.3.1)

Sl No.	Nominal thickness (mm)	Tolerance (mm)
(1)	(2)	(3)
i)	< 2	± 0.2
ii)	2	± 0.2
iii)	2.5	± 0.2
iv)	3	± 0.2
v)	3.2	± 0.2
vi)	3.5	± 0.2
vii)	4	± 0.2
viii)	5	± 0.3
ix)	5.5	± 0.3
x)	6	± 0.3
xi)	8	± 0.4
xii)	10	± 0.4
xiii)	12	± 0.5
xiv)	15	± 0.5
xv)	19	± 1.0
xvi)	25	± 1.0

4.3.2 *Dimensions (Length and Width)*

4.3.2.1 The nominal dimensions, that is, width (W) and length (L) shall be as agreed to between the purchaser and the supplier. However, the finished pane shall not be larger than a prescribed rectangle of dimensions (W + v, L + v), or smaller than a prescribed rectangle of dimensions (W – v, L – v), where v is the maximum tolerance on nominal dimensions. The corresponding sides of the prescribed rectangles shall be parallel to each other and these rectangles shall have a common centre (*see* Fig.1).

4.3.2.2 The length and width of the glass on cut sizes shall be measured with a steel scale (tape) which is graduated to 1 mm. The measurement shall be made on adjacent two sides.

The tolerances on nominal dimensions length L, and width W, shall be ± 5mm.

4.3.3 *Squareness*

The tolerances on diagonals shall be as specified in Table 3.

4.4 Optical Faults

The glass shall be viewed under the conditions of observation as described in Annex C, and the angle at which there is no optical distortion shall be noted. This angle shall not be less than the appropriate critical viewing angle (*see* Table 8).

4.5 Visual Faults

4.5.1 *Spot Faults*

Spot faults are categorized based on their size (*see* Table 4). Determination of spot faults shall be done in accordance with Annex D. The maximum permissible number of the different categories of spot faults shall be as per Tables 5 and 6.

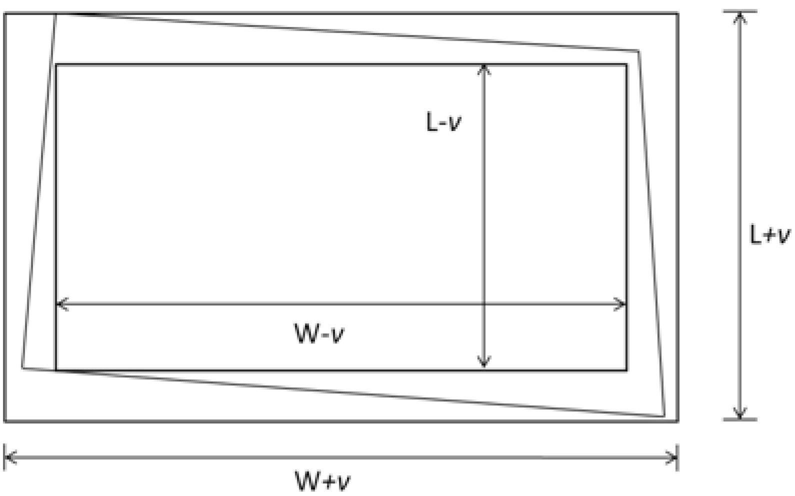


FIG. 1 TOLERANCE LIMITS FOR DIMENSIONS OF RECTANGULAR PANES

Table 3 Maximum Limit on the Difference between Diagonals

(*Clause* 4.3.3)

Sl. No.	Nominal glass thickness as per Table 2 (mm)	Maximum limit on the difference between diagonals		
		Jumbo sizes (mm)	Split sizes (mm)	
			(L, W) ≤ 1 500	1 500 < L < 4 000 1 500 < W <3 000
(1)	(2)	(3)	(4)	(5)
i)	≤ 6	10	3	4
ii)	8,10,12	10	4	5
iii)	15,19,25	10	5	6

Table 4 Categories of Spot Faults

(*Clause* 4.5.1)

Sl No	Category	Dimension of spot fault
(1)	(2)	(3)
i)	A	> 0.6 and ≤ 1.5
ii)	B	> 1.5 and ≤ 3.0
iii)	C	> 3.0 and ≤ 9.0
iv)	D	> 9.0

Table 5 Allowable Numbers in Jumbo Size

(*Clause* 4.5.1)

Sl No	Category of Fault	Average (*max*)	Maximum in any pane
(1)	(2)	(3)	(4)
i)	A	Any	Any
ii)	B	8	10
iii)	C	4	5
iv)	D	0.1	1, but faults that cause breakage are not allowed.

NOTE — The word 'average' indicates a cumulative average over at least 20 tonnes of glass.

Table 6 Allowable Numbers in Split Size

(*Clause* 4.5.1)

Sl No	Category of Fault	Average per 20 m^2 (*max*)	Maximum in any pane
(1)	(2)	(3)	(4)
i)	A	Any	Any
ii)	B	8	10
iii)	C	4	5
iv)	D	0.1	1, but faults that cause breakage are not allowed.

NOTE — The word 'average' indicates a cumulative average over at least 20 tonnes of glass.

4.5.2 *Reams, Strings and Lines*

There shall be no reams, strings and lines distinguished visually when tested in accordance with Annex E.

4.5.3 *Linear / Extended Faults*

There shall not be any linear/extended faults when tested in accordance with Annex E.

4.6 Defects on Cut Side

Defects in shape such as chipping of cut side, shelling, protrusion, slicing off, corners on/off, etc as shown in Fig. 2 shall be such that the deviation from the cutting line when viewing perpendicularly to the surface of plate glass is not more than the nominal value of thickness of glass or 10 mm, whichever is smaller.

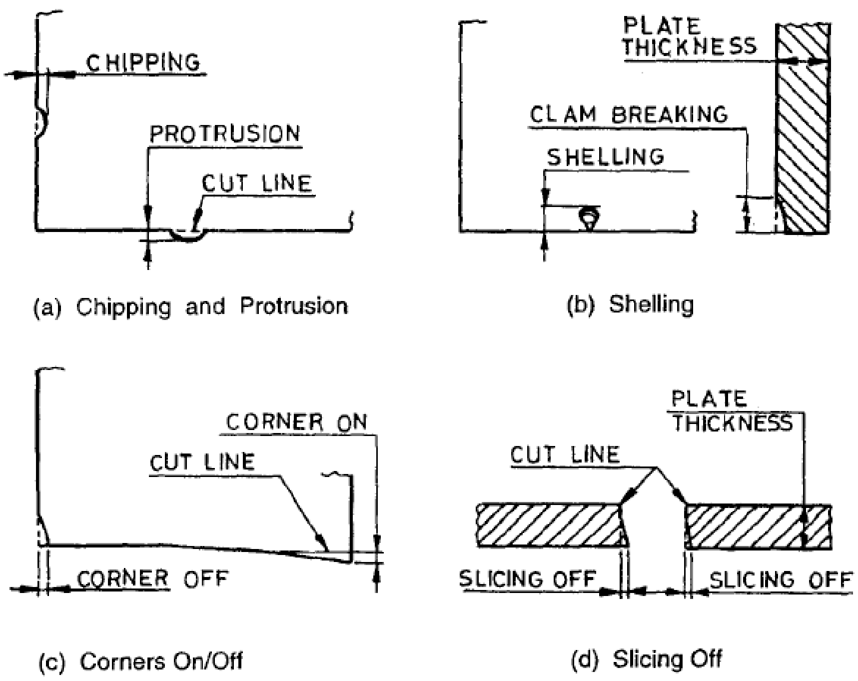


FIG. 2 DEFECTS ON CUT SIDE

4.7 Optional Requirement: Bloom

Material may be tested for bloom freedom as per Annex F whenever required by the purchaser.

5 PACKAGING AND MARKING

5.1 Packaging

Glass shall, be packed in a suitable shock-absorbing manner which shall be as agreed between manufacturer and the purchaser.

5.2 Marking

5.2.1 Each package of float glass shall be marked with the following information:

a) Name of the material "Float Glass";
b) Indication of source of manufacture;
c) Nominal thickness, in mm;
d) Nominal length and width, in mm; and
e) Number of panes per package.

5.2.2 Each piece of float glass is recommended to be marked with the following details:

a) The words "Float Glass",
b) Indication of source of manufacture, and
c) Thickness of glass.

5.2.3 *BIS Certification Marking*

Each glass may also be marked with the standard mark.

5.2.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations made thereunder. The details of the conditions under which the license for use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6 SAMPLING

Representative samples shall be drawn in accordance with Annex G for testing.

ANNEX A

(*Clause* 4.1)

UV TEST TO IDENTIFY THE TIN SIDE OF FLOAT GLASS

The air/tin side of glass shall be identified by illuminating the glass with a shortwave ultraviolet lamp in a dark area. The side that fluoresces cloudy green is the tin side. Identification of tin side clearly indicates that the glass has been manufactured as per float glass technology.

ANNEX B

(*Clause* 4.2)

DETERMINATION OF VISUAL LIGHT TRANSMITTANCE

Visual light transmittance can be determined either by means of a CIE (International Commission on Illumination) standard illuminant (*see* **B-1**) or a spectrophotometer (*see* **B-2**).

B-1 VISUAL LIGHT TRANSMISSION MEASUREMENT USING STANDARD ILLUMINANT

B-1.1 Light Source

CIE standard illuminant A, consisting of an incandescent lamp, the filament of which is contained within a parallelepiped 1.5 mm × 1.5 mm × 3 mm. The voltage at the lamp terminals shall be such that the colour temperature is 2 856 ± 50 K. This voltage shall be stabilized within ± 0.1 percent. The instrument used to check the voltage shall be of appropriate accuracy.

B-1.2 Optical System

Consisting of two colourless lenses, L1 and L2, each with a focal length, *f* of at least 500 mm and corrected for chromatic aberrations. The clear aperture of the lenses shall not exceed *f*/20. The distance between the lens L1 and the light source shall be adjusted in order to obtain a light beam which is substantially parallel. A diaphragm, A1, shall be inserted to limit the diameter of the light beam to 7 ± 1 mm. This diaphragm shall be situated at a distance of 100 ± 50 mm from the lens L1 on the side remote from the light source. A second diaphragm, A2, shall be placed in front of lens L2 which shall have the same characteristics as L1. The detector of the measuring equipment shall be placed in the focal plane of lens L2. The image of the light source shall be centred on the detector. A diaphragm, A3, with a diameter slightly larger than the cross-section of the largest dimension of the image of the light source is placed in front of the detector in order to prevent scattered light created by the sample from reaching the detector. The point of measurement shall be taken at the centre of the light beam (*see* Fig.3).

B-1.3 Measuring Equipment

The detector shall have a relative spectral responsivity in substantial agreement with the CIE spectral luminous efficiency function for photopic vision (*see* Table 7). The sensitive surface of the detector shall be covered with a diffusing medium and shall have at least twice the cross-section of the largest dimension of the image of the light source. If an integrating sphere is used as the detector, the image of the light source shall be in the entrance port of the integrating sphere and the aperture of the sphere shall be at least twice the cross-section of

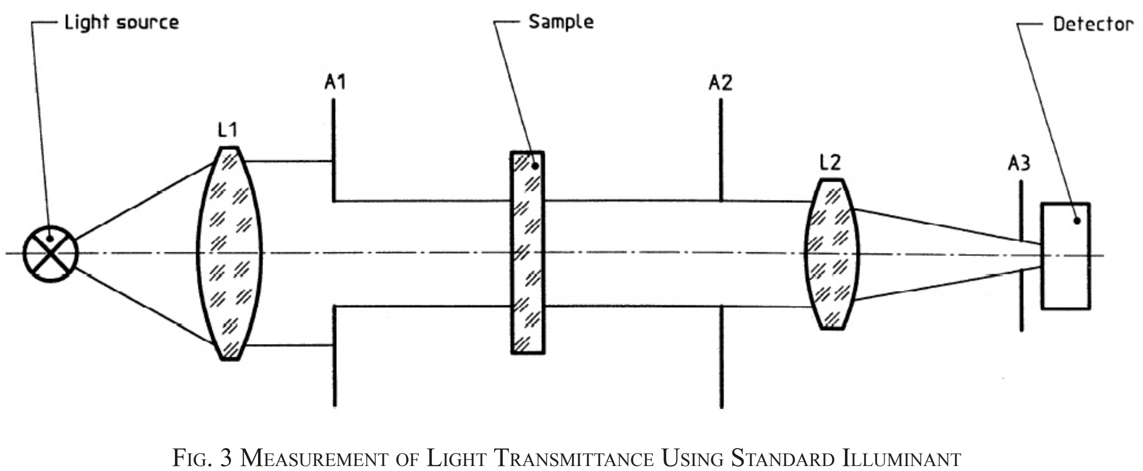


FIG. 3 MEASUREMENT OF LIGHT TRANSMITTANCE USING STANDARD ILLUMINANT

the measuring beam at that aperture. The linearity of the detector and the associated indicating instrument shall be less than or equal to ± 2 percent of full scale, or ± 10 percent of the magnitude of the reading, whichever is the smaller.

Table 7 Spectral Luminous Efficiency Function for Photopic Vision

(*Clauses* B-1.3 *and* B-2)

Sl. No	Wavelength, in nm	Standard Value of $P_\lambda \overline{Y_\lambda}$ under Standard Illuminant 'A'
(1)	(2)	(3)
i)	380	0.000 0
ii)	390	0.000 1
iii)	400	0.000 5
iv)	410	0.001 9
v)	420	0.008 0
vi)	430	0.026 5
vii)	440	0.060 9
viii)	450	0.116 7
ix)	460	0.209 8
x)	470	0.362 4
xi)	480	0.619 8
xii)	490	1.039 3
xiii)	500	1.795 6
xiv)	510	3.084 9
xv)	520	4.761 4
xvi)	530	6.323 0
xvii)	540	7.598 5
xviii)	550	8.570 7
xix)	560	9.220 1
xx)	570	9.457 4
xxi)	580	9.225 7
xxii)	590	8.543 0
xxiii)	600	7.546 0
xxiv)	610	6.359 9
xxv)	620	5.064 9
xxvi)	630	3.712 2
xxvii)	640	2.558 7
xxviii)	650	1.638 9
xxix)	660	0.970 6
xxx)	670	0.532 7
xxxi)	680	0.289 6
xxxii)	690	0.146 7
xxxiii)	700	0.074 4
xxxiv)	710	0.039 8
xxxv)	720	0.0195
xxxvi)	730	0.010 0
xxxvii)	740	0.006 2
xxxviii)	750	0.002 1
xxxix)	760	0.001 1
xl)	770	0.000 0

where,

P_λ = spectral energy distribution of the incident light at, each wavelength; and

$\overline{Y_\lambda}$ = distribution co-efficient, defined by CIE.

B-1.4 Measurement of Visual Light Transmission

B-1.4.1 Adjust the instrument indicating the response of the detector to indicate 100 divisions when the glass sample is not inserted in the light path. When no light is falling on the detector, the instrument shall read zero.

B-1.4.2 Place the glass sample between the diaphragms A1 and A2, and adjust its orientation in such a way that the angle of incidence of the light beam is equal to 0 ± 5°. Measure the regular transmittance of the glass sample, for every point measured, read the number of divisions, n, shown on the indicating instrument.

B-1.4.3 The regular transmittance τ_r, is equal to n/l00 and is determined for any point on the glass sample.

B-2 VISUAL LIGHT TRANSMISSION MEASUREMENT USING SPECTROPHOTOMETER

B-2.1 Alternate to CIE Standard Illuminant (A), a spectrophotometer covering the wavelength from 380 to 770 nm may be used to measure visual light transmission. Measure the light transmission of the specimen covering the wavelength from 380 to 770 nm at an interval of 10 nm using a suitable spectrophotometer and express the value of tristimulus *Y* in percent under the standard illuminant (A) which shall be taken as the visible light transmission.

Value for *Y* under standard illuminant (A) is to be calculated as follows:

$$Y = \sum P_\lambda T_\lambda \overline{Y_\lambda}$$

where,

P_λ = spectral energy distribution of the incident light at each wavelength;

T_λ = spectral transmission of glass at each wavelength; and

$\overline{Y_\lambda}$ = distribution co-efficient defined by CIE.

B-2.2 The standard value of $P_\lambda \overline{Y_\lambda}$ at each wavelength from 380 to 770 nm at an interval of 10 nm under standard illuminant (A) is given in table 7. The light transmission is the ratio of *Y* tristimulus of the light transmitted by the glass and that of the illuminant alone,

$$\text{Light Transmission (Y)} = \frac{\sum T_\lambda P_\lambda \overline{Y_\lambda}}{P_\lambda \overline{Y_\lambda}}$$

ANNEX C

(*Clause* 4.4)

DETERMINATION OF OPTICAL FAULTS

A screen bearing an assembly of black and white stripes (zebra) is observed through the glass. The usual size of the screen is between 1 500 mm × 1 150 mm and 2 500 mm × 2 000 mm. It consists of a translucent white background with parallel black stripes, 25 mm wide and 25 mm apart, and inclined at 45°.

The screen is uniformly lit from behind with white daylight fluorescent tubes. The illuminance of the screen measured at 1m distance shall be between 400 lux and 1 200 lux. The measurement shall be taken at a point on a line normal to the center of the screen. The walls of the test room should be painted with a dark non-reflective paint having diffuse reflection ≤ 0.10.

The glass to be examined shall be held vertical in a support frame. The center of glass shall be at a distance of 4.5 m from the screen and on a line normal to the centre of the screen. The glass shall be capable of being rotated around a vertical axis. The glass shall be held with the direction of draw of the glass vertical. Appropriate critical viewing angle α, formed by the glass and the screen should be noted. The observer stands still at a distance of 9 m from the center of the screen on a line passing through the axis of rotation.

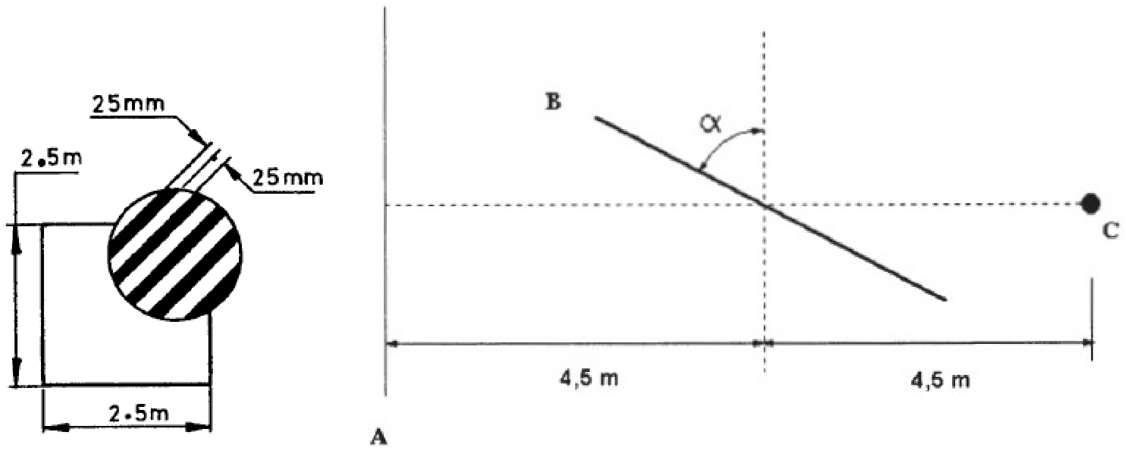
The glass being examined is rotated from the angle α = 90°, until there is no longer any distortion of the lines on the screen. The angle at which this occurred is noted.

The glass sample shall have a height between 300 mm to 500 mm and a width of approximately 800 mm. Distortion is measured in area D and d as shown in Fig 5.

Table 8 Critical viewing angle

(*Clause* 4.4)

Sl. No	Nominal thickness of glass (mm)	Angle α in zone D, degree	Angle α in zone d, degree
(1)	(2)	(3)	(4)
i)	2	40	40
ii)	2.5	45	40
iii)	≥ 3	50	45



(A — Screen, B — Glass Sample, and C — Observer)

FIG. 4 SET UP OF ZEBRA TEST

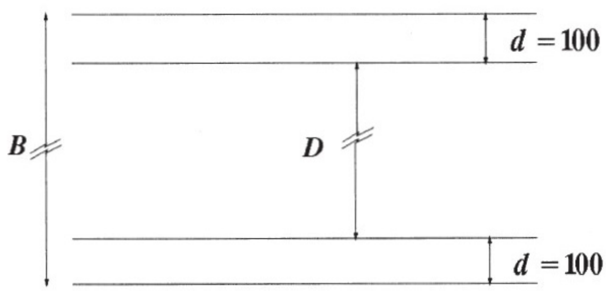


FIG. 5 ZONE FOR THE MEASUREMENT OF OPTICAL DISTORTION

ANNEX D

(*Clause* 4.5.1)

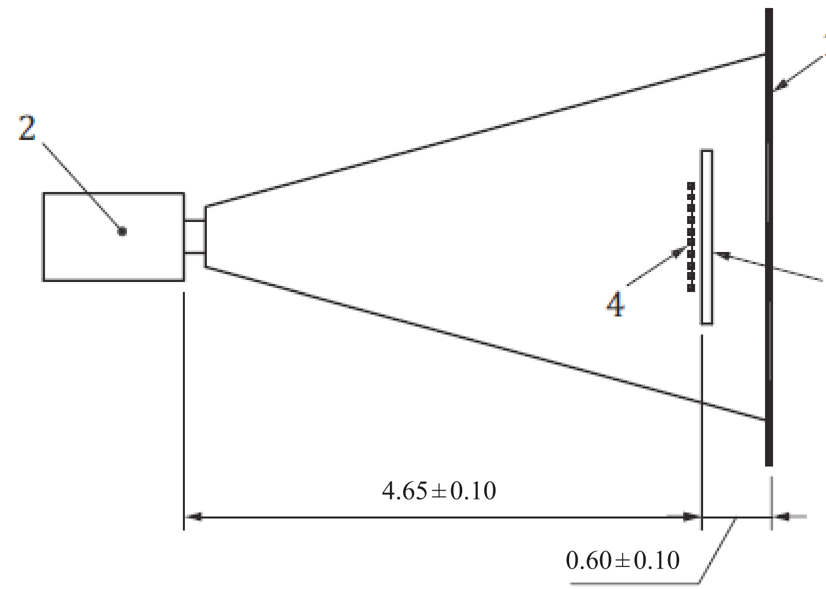
DETERMINATION OF SPOT FAULTS

D-1 CONDITIONS OF OBSERVATION

The method for measuring spot fault size including halo is based on the projection technique, using a point source projector and a screen (*see* Fig. 6). A projector with a mercury vapour short-arc lamp of 200 Watts is placed at 4.65 ± 0.10 m from the projection screen. The glass or sample containing the spot fault is placed at 0.60 ± 0.10 m, away from the projection screen, in the path of light beam of the projector. The sample is placed parallel to the screen. The spot fault image (nucleus and deformation) appears on the screen.

D-2 MEASUREMENT OF THE SIZE OF THE SPOT FAULT INCLUDING HALO

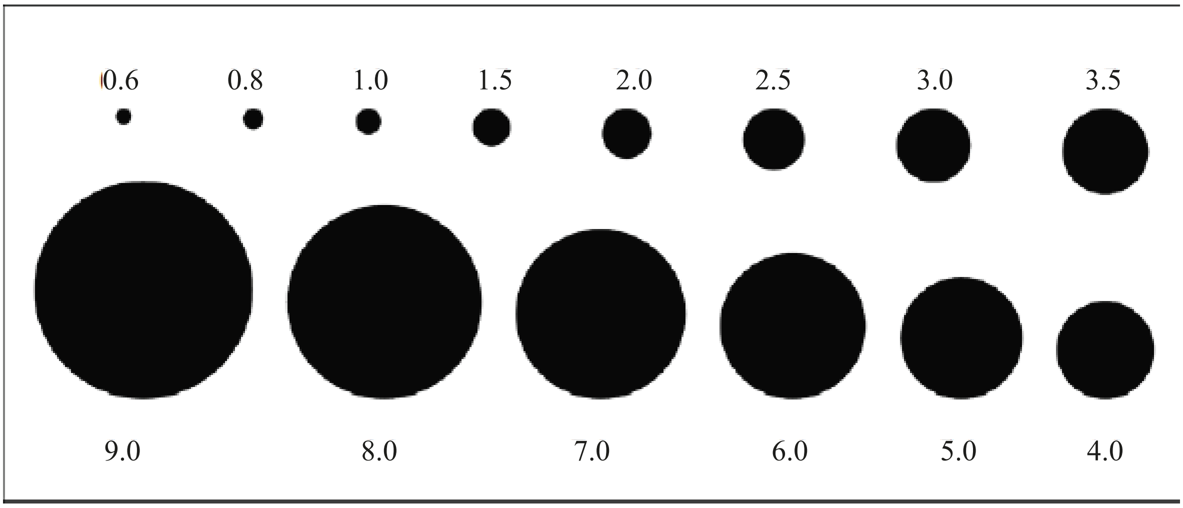
Place a distortion gauge (plastic transparent sheet on which circular black spots with different diameters from 0.6 mm to 9.0 mm are reproduced, *see* Fig.7) on the surface of the glass, where the spot fault is located. Compare the size of the spot fault with the circular black spot of minimum size in the distortion gauge, which overlaps the image of the spot fault on the screen completely.



(All dimensions are in m)

Key	
1	Screen
2	Point source projector
3	Glass sample with spot fault
4	Distortion gauge

Fig. 6 Method of Observation of the Sample



(All dimensions are in mm)

FIG. 7 EXAMPLE OF DISTORTION GAUGE WITH PRINTED BLACK SPOTS

The spot fault size including halo is the diameter of this circular black spot.

NOTE — For more accuracy, a calliper could be used instead of the plastic distortion gauge.

ANNEX E

(*Clauses* 4.5.2 *and* 4.5.3)

DETERMINATION OF REAMS, STRINGS, LINES AND LINEAR FAULTS

A set of fluorescent lamps are placed horizontally on a black mat surface coated vertical wall. The lamps shall be placed in four parallel steps 50 cm apart (*see* Fig. 8b). The glass specimen shall be placed parallel to and vertically in front of the wall at a distance of 1 m. The glass shall be illuminated by the lamps from one side and shall be examined from the other side (*see* Fig. 8a). Observe the specimen for defects like linear faults, reams, strings and lines. The observation shall not be affected by light from outside.

NOTE — The fluorescent lamp shall be a cool white 40 W fluorescent lamp of 120 cm in length and, if the length exceeding 120 cm is required, plural lamps shall be installed touching end by end in tandem.

The distance between the specimen glass and the observer shall be approximately 2 m for linear faults and 4 m for reams, strings, lines.

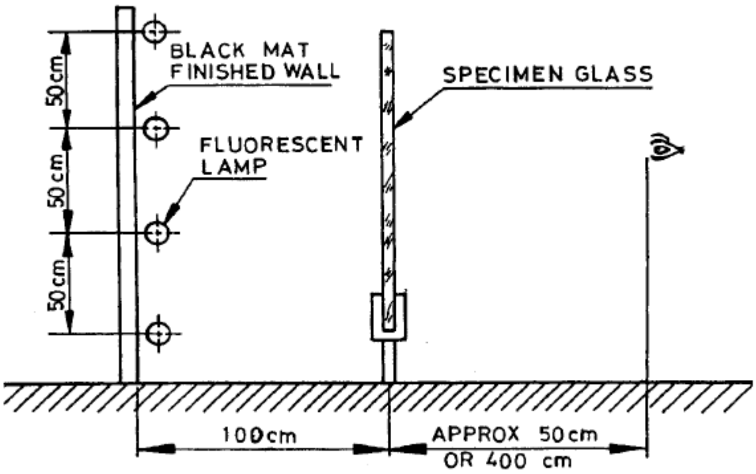


FIG.8A ARRANGEMENT FOR DETECTING DEFECTS

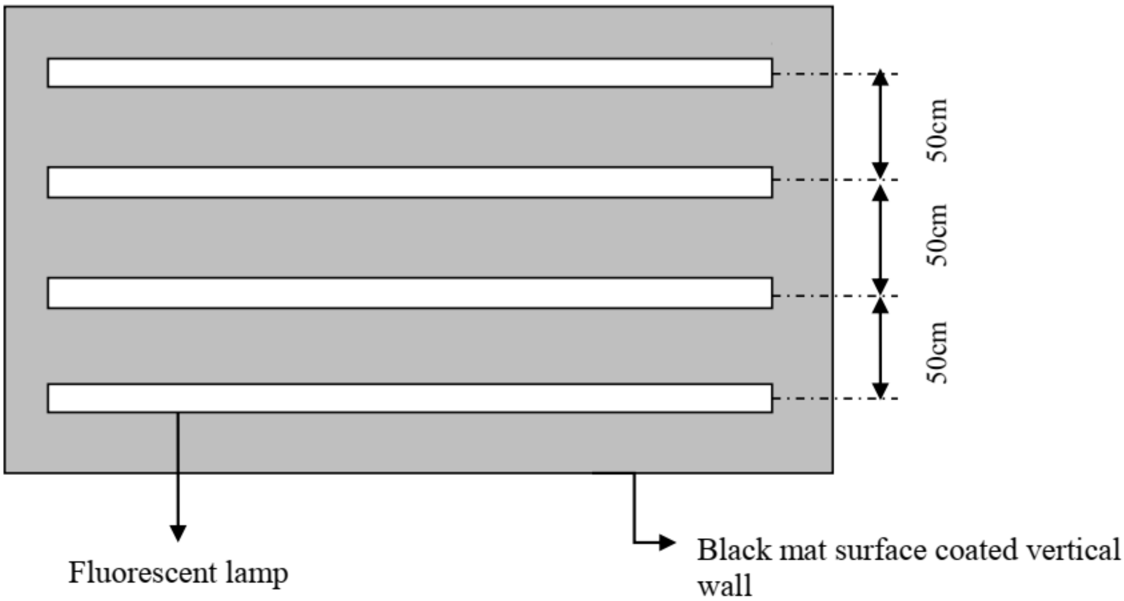


FIG.8B VERTICAL WALL WITH FLUORESCENT LAMPS

ANNEX F

(*Clause* 4.7)

DETERMINATION OF BLOOM

F-1 APPARATUS

F-1.1 Electric Furnace

The furnace can accommodate a glass of minimum size 600 mm × 600 mm in vertical position. The heating area should be minimum 150 mm bigger all around than the glass size. The temperature of the furnace should be such that the glass inside may attain a temperature of 630 ± 5°C within 3 to 4 min. The furnace shall be controlled by a temperature indicator-cum controller and the temperature may be sensed with the help of thermocouple inserted inside the furnace atmosphere. The furnace shall have a peep window through which an optical pyrometer can be focused on the glass surface from outside. The general arrangement of the furnace shall be as per Fig. 9.

F-1.2 Optical Pyrometer

Of the range up to 1 000°C.

F-2 PROCEDURE

Place the glass inside the furnace and close the door. Focus the optical pyrometer on the surface of the glass which shall indicate gradual increase of the surface temperature of the glass. When the temperature reaches 630 ± 5°C, switch off the furnace and allows the glass to cool till it attains room temperature.

F-3 OBSERVATION

The glass shall be inspected for bloom in natural light. No fogginess, rainbow colour shall be visible on the glass surface.

NOTE — An area of 20 mm width all along the periphery of the glass shall be excluded for inspection.

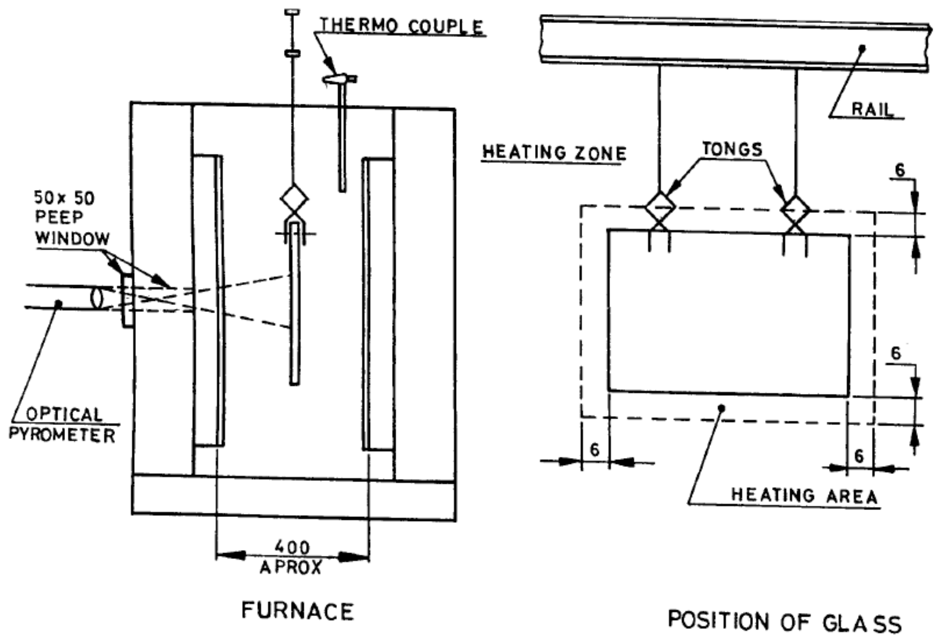


Fig. 9 General Arrangement Of Electric Heating Furnace

ANNEX G

(*Clause* 6)

SAMPLING OF FLOAT GLASS

G-1 SCALE OF SAMPLING

G-1.1 Lot

In a single consignment, glass of the same quality and nominal thickness and belonging to the same batch of manufacture shall constitute a lot.

G-1.2 Samples shall be tested separately from each lot for ascertaining conformity of float glass to the requirements of this specification.

G-1.3 The number of float glass panes to be sampled from a lot for this purpose shall depend on lot size and shall be in accordance with co1 2 and 4 of Table 9. If the panes are packed in boxes or cartons, at least 20 percent of them, subject to minimum of 2 boxes shall be selected at random and opened for taking out the samples. Approximately equal number of sheets shall be selected from the middle and both the ends of each selected box or carton to give the required sample size. In order to ensure randomness of selection of float glass from the lot, procedures given in IS 4905, may be adopted.

G-2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

G-2.1 UV Test to Identify Tin Side of Float Glass

Samples selected in **G-1.3** shall be examined for the requirement of UV test. The sample size for this test shall be as per co1 9 of Table 9. Reject the lot if any one of the samples fail.

G-2.2 Distribution of Visual Faults, Optical Faults and Visual Light Transmission

Samples selected in **G-1.3** shall be examined for the requirements of visual faults, optical faults and visual light transmission in two stages as shown in co1 3 of Table 9. A glass sample failing to satisfy any of these requirements shall be considered as defective. If the number of defective pieces found in the sample in the first stage is less than or equal to the corresponding number given in co1 6 of Table 9, the lot shall be accepted. If it is equal to or greater than the corresponding number given in co1 7 of Table 9, the lot shall be rejected without any further testing.

If the number of defective sheets found in the sample in the first stage lies between C_1 and C_2, a second such sample of the size prescribed in co1 4 of Table 9 shall be taken and examined. The lot shall be considered as conforming to these requirements if the combined number of defectives in the first and second stage is less than the corresponding number C_3, given in co1 8 of Table 9; otherwise the lot shall be rejected.

G-2.3 Nominal Thickness and Dimensional Tolerance

The lot, which has satisfied the requirements given in **G-2.2**, shall be examined for these requirements. The sample sheets required for testing these characteristics shall be selected from those examined under **G-2.2** and found satisfactory. The sample size for these tests shall be as given in co1 9 of Table 9. The lot shall be considered to have met these requirements, if the number of defective sheets found in the sample is less than or equal to the corresponding number C_4, given in co1 10 of Table 9.

Table 9 Scale of Sampling and Criteria for Conformity

Sl. No.	Lot	For distribution of visual faults, optical faults and visual light transmission						Nominal thickness and dimensional tolerance	
		Stage	Sample size (no. of panes)	Combined size (no. of panes)	C_1	C_2	C_3	Sample size	C_4
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(8)	(9)	(10)
i)	< 500 tonnes	First	8	8	0	2	2	4	0
ii)		Second	10	18					
iii)	≥ 500, upto 1 500 tonnes	First	14	14	0	2	2	5	1
iv)		Second	16	30					
v)	≥ 1 500, upto 2 500 tonnes	First	20	20	1	3	4	8	1
vi)		Second	20	40					
vii)	≥ 2 500 tonnes	First	22	22	1	3	5	10	1
viii)		Second	25	47					

ANNEX H

(*Foreword*)

COMMITTEE COMPOSITION

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