AMENDMENT NO. 1 JUNE 2022
TO
IS 2553 (Part 1) : 2018 SAFETY GLASS — SPECIFICATION
PART 1 ARCHITECTURAL, BUILDING AND GENERAL USES

(Fourth Revision)

(*Page* 2, *clause* **3.22**) — Insert the following at the end:

'**3.23 Concave** — "Hollow" face of curved glass.

3.24 Convex — **"**Bulge" face of curved glass.

3.25 Cross-Curve Deviation (sag) — Deviation from a straight line or reference curve perpendicular to the curvature measured on the concave side.

3.26 Edge Straightness Deviation (warp R_B) — Deviation from straightness of the straight edges of the glass.

3.27 Girth (G) — Distance around the concave or convex surface measured perpendicular to the height including any flats.

3.28 Length (L) — Dimension of the straight edge of the curved glass or dimension of the longest edge in flat glass.

3.29 Shape Accuracy (P_C) — Accuracy of the contoured form including curvature, arc(s), and even flats.

3.30 Thickness (T) — Nominal thickness of the final product

> NOTE — In a curved insulating glass, the thickness is the sum of the thicknesses of the inner glass (T_i), the gas space (T_a) and the outer glass (T_e).'

(*Page* 3, *clause* **5.1.2,** *second line*) — Insert the word 'annealed' between the words 'flat' and 'glass' in the second sentence.

(*Page* 3, *clause* **5.2,** *Title*) — Substitute the following for the existing:

'**Requirements Specific to Toughened (Tempered) Safety Glass**'

(*Page* 3, *clause* **5.2.2**) — Insert a sub clause **5.2.2.3** under the clause **5.2.2**:

'**5.2.2.3** *Dimensional tolerances for curved toughened (tempered) safety glass*

5.2.2.3.1 *Shape accuracy, girth and length*

Measure the shape accuracy perpendicular to the glass using a gauge or a 1:1 scale template. Measure the girth dimension on the convex surface using a flexible steel tape measure of 1

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mm in scale interval. Measure the length of the sides using a steel tape or a straightedge of 1 mm scale interval.

When measured in accordance with the above steps, the tolerances on shape accuracy, girth and length shall be as given in Table 1A, illustrated in Fig. 1A.

Table 1A — Tolerances on the shape accuracy, girth and length

(*Clause* 5.2.2.3.1)

Sl No.		Tolerance	
		Thickness < 10 mm	**Thickness ≥ 10 mm**
(1)	(2)	(3)	(4)
i)	$\Delta P_C{}^a$	⅔T	½ T
ii)	ΔG	± 2 mm/m	± 3 mm/m
iii)	ΔL	± 2 mm/m	± 3 mm/m
	^{a}Measured perpendicularly to the glass.		

where

ΔP_C = Tolerance on the shape accuracy;
ΔG = Tolerance on the overall girth;
ΔL = Tolerance on length; and
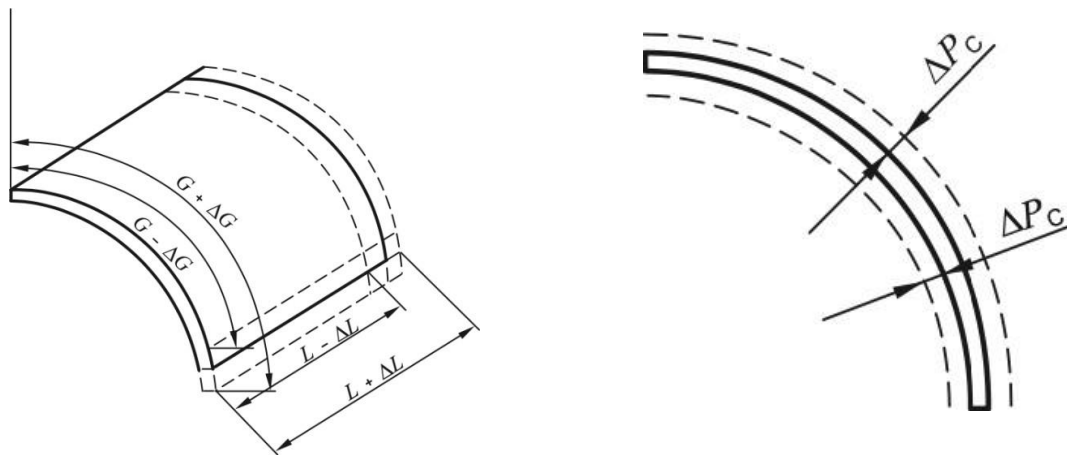T = Nominal thickness of the final product

FIG. 1A TOLERANCES ON SHAPE ACCURACY, GIRTH AND LENGTH

5.2.2.3.2 *Edge straightness deviation (ΔR_B)*

The edge straightness deviation should be measured with the glass in a vertical position as shown in Fig. 1B. Place a straightedge ruler, with 0.1 mm intervals, horizontally along the length of the glass to measure the gap between the glass specimen and the ruler.

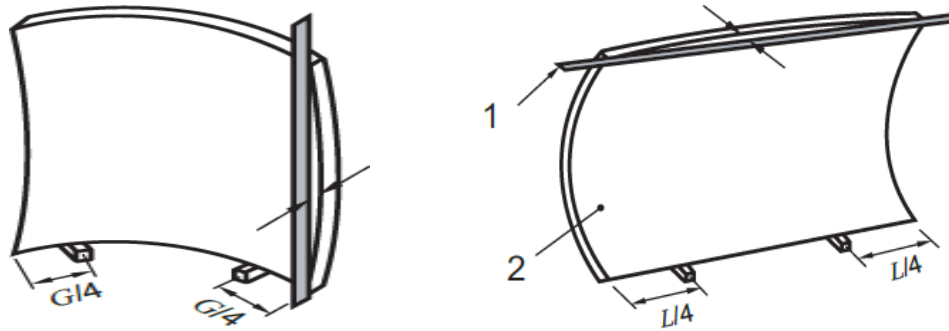NOTE — An example of edge straightness deviation is shown in Fig. 1C.

FIG. 1B MEASUREMENT OF EDGE STRAIGHTNESS DEVIATION

key

1 Straightedge or a piece of thin and strong string can be used.

2 Glass concave surface or convex surface.

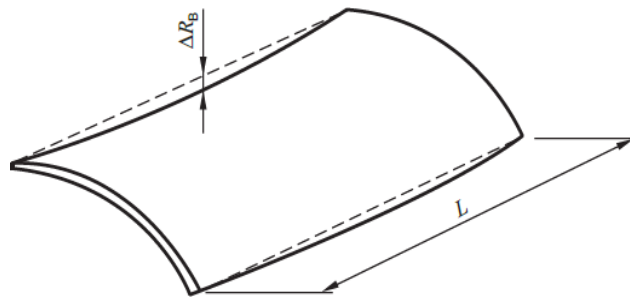The acceptable limit for edge straightness deviation shall be $\Delta R_B \leq 3$ mm/m or 2 mm, whichever is greater.

FIG. 1C EXAMPLE OF EDGE STRAIGHTNESS DEVIATION

5.2.2.3.3 *Maximum cross-curve deviation*

Place a straightedge along the vertical edge (perpendicular to the arc) on the concave surface of glass, then measure the distance between the glass and the straightedge as shown in Fig. 1D.
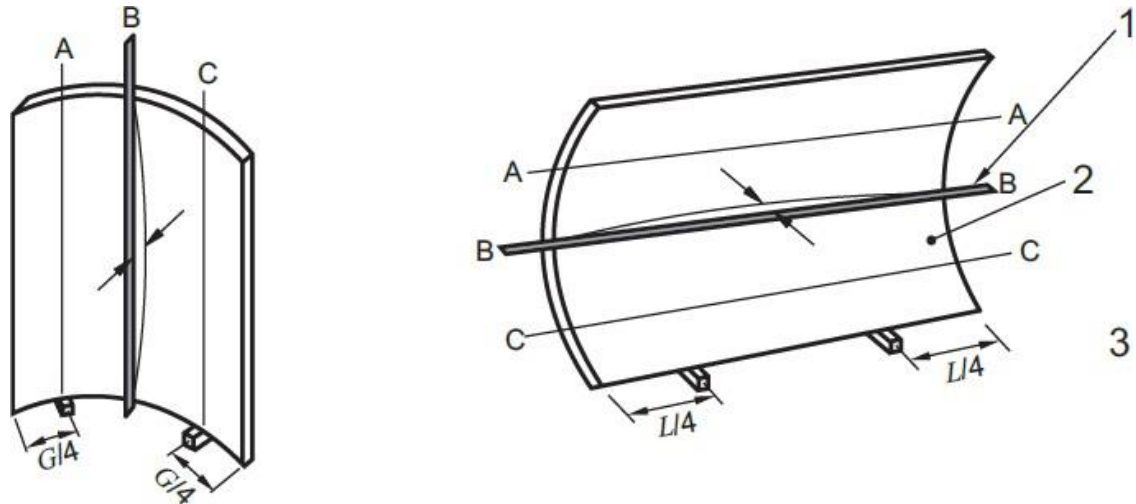
FIG. 1D MEASUREMENT OF CROSS-CURVE DEVIATION

key:

1 Straightedge or a piece of thin strong string can be used. Measuring points: A-A, B-B, C-C.

2 Glass concave surface or convex surface.

3 Setting of the glass shall be either way as shown above.

NOTE — The cross-bend deviation shall be distinguished from warp of the height.

The maximum cross-curve deviation shall not exceed 4 mm/m of the length. This maximum cross-curve deviation shall be distinguished from edge straightness deviation.'

(*Page* 3, *Table* 1) — Substitute the following table for the existing table:

Table 1 Deviation on Width and Length
(*Clause* 5.2.2.2, 5.2.8.3, 5.3.2.1)

Sl No.	Nominal Thickness ➞ Nominal Dimension W or L/H	Maximum tolerance (v) on nominal dimensions for thickness ≤ 8	Maximum tolerance (v) on nominal dimensions for thickness > 8
(1)	(2)	(3)	(4)
i)	≤ 2 000	≤ 2	≤ 3
ii)	≤ 3 000	≤ 3	≤ 4
iii)	> 3 000	≤ 4	≤ 5
	All dimensions are in mm.		

(*Page* 3, *clause* **5.2.3**) — Substitute the following for the existing:

'When tested in accordance with the method prescribed in **6.1** of IS 17004, toughened safety glass shall have the particle count of each test specimen not less than the values prescribed in the Table 1B.'

Table 1B Minimum Particle Count Values
(*Clause* 5.2.3)

Sl No.	Nominal Thickness	Minimum Particle Count
	(mm)	(Number)
(1)	(2)	(3)
i)	3 to 3.5	15
ii)	4 to 12	40
iii)	15 to 25	30

NOTES
1 The nominal thicknesses are based on **5.2.1.**
2 For thickness less than 3 mm, the interpretation of the results shall be as agreed to between the manufacturer and the purchaser.

(*Page* 5, *Table* 2) — Insert the following footnote in Table 2:

'NOTE — This test is not applicable for glasses having thickness less than 4 mm.'

(*Page* 6, *clause* **5.2.5.2**) — Substitute the following for the existing:

'All the test specimens shall conform to Class I of **6.4.5.2** of IS 17004, when tested in accordance with the resistance to human impact test prescribed in **6.4** of IS 17004. This test is not applicable for glasses having thickness less than 5 mm. Also, for the time being till the committee formulates an alternative test method, this test is not applicable in case the furnace size is such that it is unable to produce the toughened glass of dimensions required in **6.4.3.2** of IS 17004.'

(*Page* 11, *clause* **5.3.4**) — Substitute the following for the existing:

'Laminated safety glass shall be subjected to boil test as prescribed in **7.1.1** of IS 17004 and the bake test as prescribed in **7.1.2** of IS 17004. In both these tests, none of the three samples tested shall show any faults (bubbles, delamination, haziness and clouding) leaving 15 mm from an original edge and 20 mm from a cut edge of the specimen. In case only one test specimen develops faults in a particular test, draw another 3 samples from the lot and repeat the concerned test. No sample shall fail this time."

(*Page* 13, *clause* **6.2.1**) — Substitute the following for the existing:

'In case of glass for architectural purposes, each piece of safety glass shall be marked indelibly and distinctly and in case of glass for non-architectural purposes, each piece of safety glass shall be marked legibly with the following information:

i. In the case of toughened safety glass, it shall be marked with the word "Toughened".

ii. In the case of laminated safety glass, it shall be marked with the words "Laminated Safety" or "Toughened Laminated Safety".

iii. Indication of the source and year of manufacture.'

(*Page* 14, *Table* 12) — Substitute the following table for the existing table:

Table 12 Sample Size and Criteria for Conformity for Toughened Safety Glass
(Clause A-1)

Sl No.	Testing Parameters	No. of Samples	Size of Samples	Acceptance Criteria
(1)	(2)	(3)	(4)	(5)
i)	Thickness (*Clause* **5.2.1**)	5 percent of the quantity from each size, but not less than five safety glasses.	Actual size of product	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
ii)	Dimensions and Squareness (*Clause* **5.2.2**)	5 percent of the quantity from each size, but not less than five safety glasses.	Actual size of product	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
iii)	Flatness (*Clause* **5.2.4**)	5 percent of the quantity from each size, but not less than five safety glasses.	Actual size of product	All samples shall pass. In case of any single failure, draw another 5 percent and repeat the tests. None of these samples shall fail.
iv)	Fragmentation test (*Clause* **5.2.3**)	2	*Min* 0.36 m²	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.
v)	Resistance to shock test (*Clause* **5.2.5.1**)	2	610 mm × 610 mm	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.
vi)	Resistance to human impact test (*Clause* **5.2.5.2**)	2	1 938 mm × 876 mm	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.

Sl No.	Testing Parameters	No. of Samples	Size of Samples	Acceptance Criteria
(1)	(2)	(3)	(4)	(5)
vii)	Surface compression test (*Clause* **5.2.6**) (Optional)	2	360 mm × 1 100 mm	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.
viii)	Four point bending test (*Clause* **5.2.7**) (Optional)	2	360 mm × 1 100 mm	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.

(*Page* 15, *Table* 13) — Substitute the following title for the existing title of the table:

'Table 13 Sample Size and Criteria for Conformity for Laminated Safety Glass'

(*Page* 15, *Table* 13, *Sl no. 9*) — Substitute the following for the existing:

Table 13 Sample Size and Criteria for Conformity for Laminated Safety Glass
(*Concluded*)

Sl No.	Testing Parameters	No. of Samples	Size of Samples	Acceptance Criteria
ix)	Resistance to human impact test (*Clause* **5.3.8**)	2	1 938 mm × 876 mm	All samples shall pass. In case of any single failure, draw another 2 samples from the lot and repeat the test. None of these 2 samples shall fail.

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